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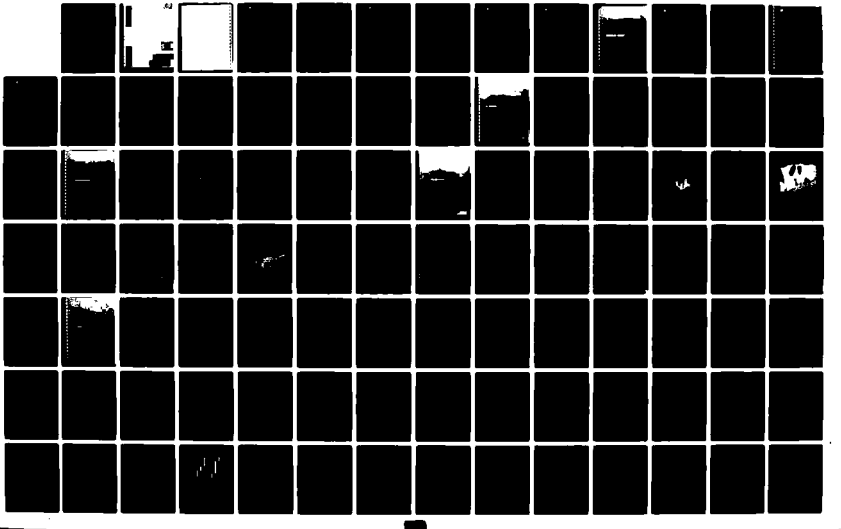

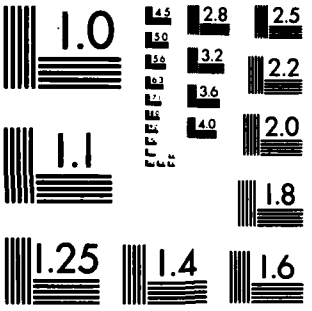

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INSTALLATION RESTORATION PROGRAM RECORDS SEARCH

For

EIELSON AIR FORCE BASE, ALASKA

Prepared for

AIR FORCE ENGINEERING AND SERVICES CENTER
DIRECTORATE OF ENVIRONMENTAL PLANNING
TYNDALL AIR FORCE BASE, FLORIDA 32403

AND

ALASKAN AIR COMMAND
ELMENDORF AIR FORCE BASE, ALASKA 99506

By

CH2M HILL
Gainesville, Florida

CH2M HILL

November 1982

Contract No. F08637 80-G0010 6001

NOTICE

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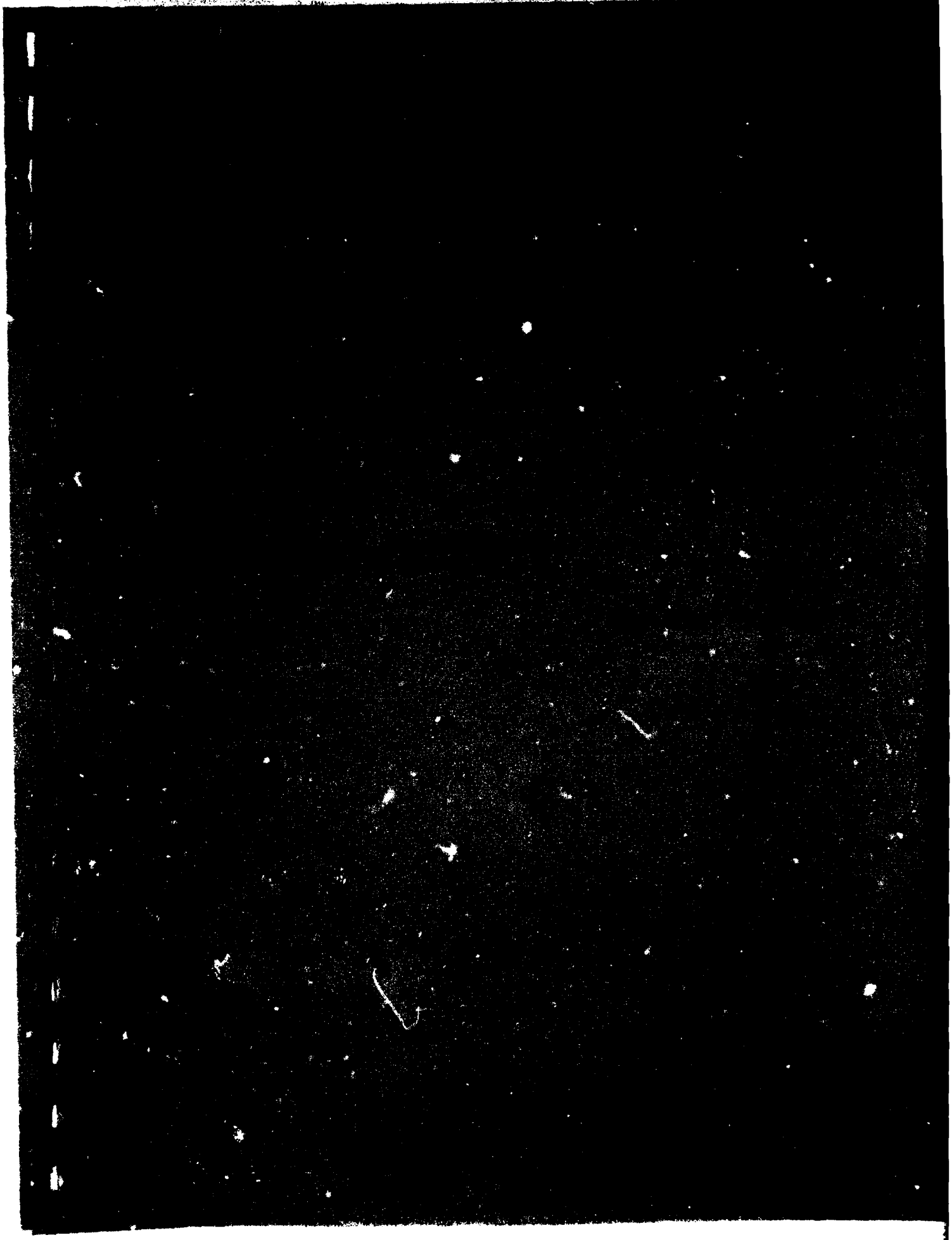
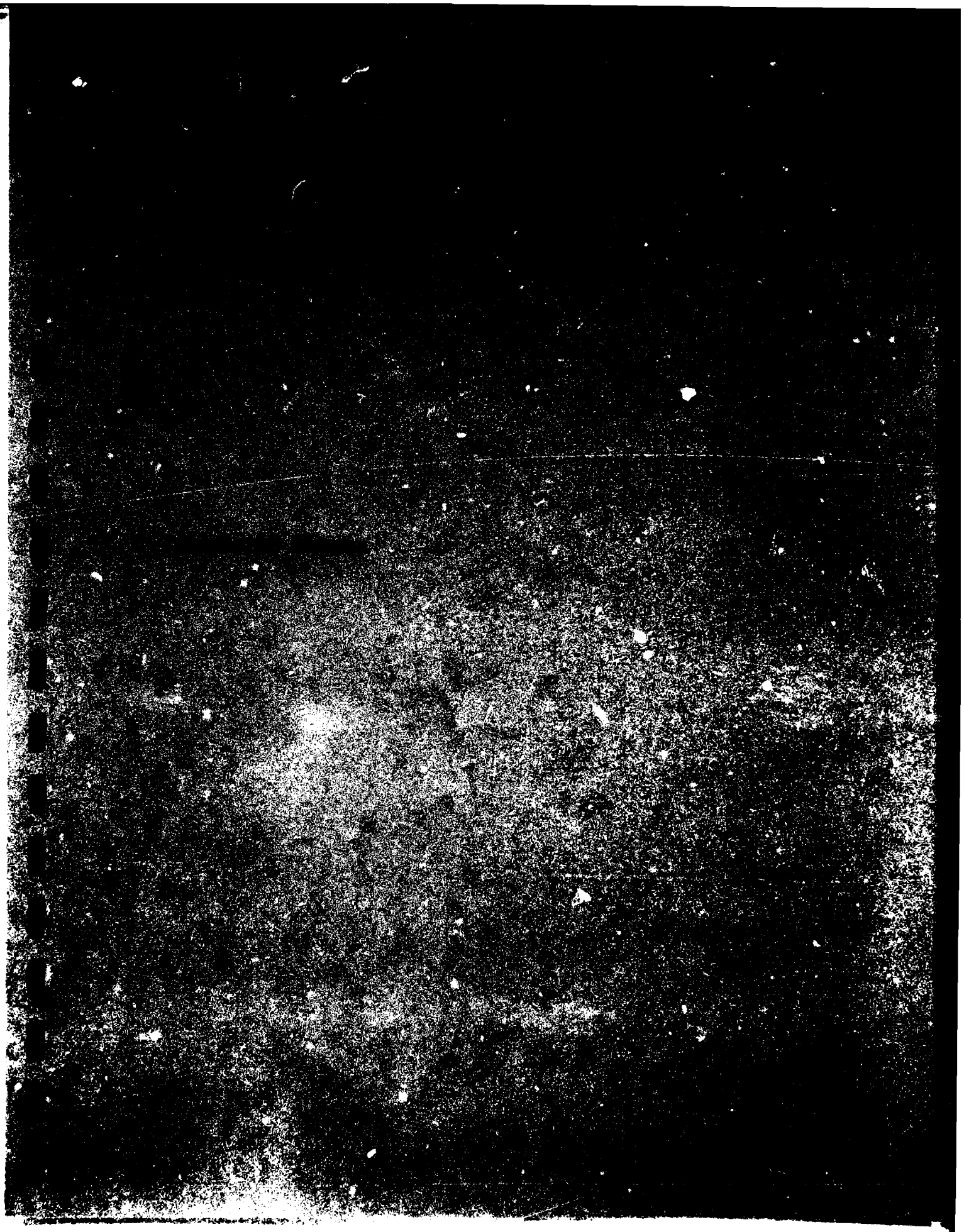


LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS USED IN THE TEXT

AAC	Alaskan Air Command
AFB	Air Force Base
AFESC	Air Force Engineering and Services Center
AGE	Aerospace Ground Equipment
AVGAS	Aviation Gasoline
Bldg.	Building
bls	Below Land Surface
cm/s	Centimeters per Second
COD	Chemical Oxygen Demand
DEQPPM	Defense Environmental Quality Program Policy Memorandum
DoD	Department of Defense
DPDO	Defense Property Disposal Office
EOD	Explosive Ordance Disposal
EPA	Environmental Protection Agency
°F	Degrees Fahrenheit
Fac.	Facility
ft	Feet
ft/day	Feet per Day
ft/ft	Feet per Foot
ft/min	Feet per Minute
gal	Gallons
gal/mo	Gallons per Month
gal/yr	Gallons per Year
gpd	Gallons per Day
gpm	Gallons per Minute
HARM	Hazardous Assessment Rating Methdology
in	Inches
IRP	Installation Restoration Program
JP	Jet Petroleum (Fuel)
lb/mo	Pounds per Month
lb/yr	Pounds per Year
Max.	Maximum
MEK	Methyl Ethyl Ketone
mg/l	Milligrams per Liter

mgd	Million Gallons per Day
mo.	Month
MOGAS	Motor Gasoline
msl	Mean Sea Level
NDI	Non-Destructive Inspection
No.	Number
NPDES	National Pollutant Discharge Elimination System
OEHL	Occupational and Environmental Health Laboratory
OSHA	Occupational Safety and Health Administration
PCBs	Polychlorinated Biphenyls
PD 680	Petroleum Distillate (Stoddard Solvent
POL	Petroleum, Oil, and Lubricants
ppm	Parts per Million
RCRA	Resource Conservation and Recovery Act
TCE	Trichloroethylene
TOC	Total Organic Carbon
USAF	United States Air Force
USFWS	United States Fish and Wildlife Service



EXECUTIVE SUMMARY

A. INTRODUCTION

1. CH2M HILL was retained by the Air Force Engineering and Services Center (AFESC) on June 9, 1982, to conduct the Eielson Air Force Base (AFB) records search under Contract No. F0863780 G0010 6001, with funds provided by Alaskan Air Command (AAC).

2. Department of Defense (DoD) policy was directed by Defense Environmental Quality Program Policy Memorandum (DEQPPM) 81-5 dated 11 December 1981 and implemented by Air Force message dated 21 January 1982 as a positive action to ensure compliance of Air Force installations with existing environmental regulations. DEQPPM 81-5 reissued and amplified all previous directives and memoranda on the Installation Restoration Program. DoD policy is to identify and fully evaluate suspected problems associated with past hazardous material disposal sites on DoD facilities, control the migration of hazardous contamination from such facilities, and control hazards to health and welfare that may have resulted from these past operations.

3. To implement the DoD policy, a four-phase Installation Restoration Program has been directed. Phase I, the records search, is the identification of potential problems. Phase II (not part of this contract) consists of follow-on field work as determined from Phase I. Phase II consists of a preliminary survey to confirm or rule out the presence and/or migration of contaminants and, if necessary, additional field work to determine the extent and magnitude of contaminant migration.

Phase III (not part of this contract) consists of a technology base development study to support the development of project plans for controlling migration or restoring the installation. Phase IV (not part of this contract) includes those efforts which are required to control identified hazardous conditions.

4. The Eielson AFB records search included a detailed review of pertinent installation records, contacts with 15 government organizations for documents relevant to the records search effort, and an onsite base visit conducted by CH2M HILL during the week of August 2 through August 6, 1982. Activities conducted during the onsite base visit included interviews with 27 past and present base employees, a ground tour of the installation, and a detailed search of installation records.

B. MAJOR FINDINGS

1. Many of the industrial activities on Eielson AFB are related to the handling, maintenance, and management of millions of gallons of fuels.

2. The major industrial operations at Eielson AFB involving hazardous chemicals and wastes have been in existence since the early 1950s. The major industrial operations include propulsion shops, pneudraulics shops, aerospace ground equipment maintenance shops, non-destructive inspection labs, and vehicle maintenance shops. These industrial operations generate varying quantities of waste oils, fuels, solvents, and cleaners.

3. The standard procedures for the final disposition of the majority of waste oils has been (1) road oiling, fire department training exercises, and landfill (1950 to 1972); (2) road oiling, landfill, and salvage through the Defense Property Disposal Office (DPDO) (1972 to 1978); and (3) road oiling and salvage through DPDO (1978 to present). The standard procedures for the final disposition of contaminated fuels has been (1) road oiling, fire department training exercises, and disposal in the waste POL pit (1950 to 1972); and (2) road oiling, fire department training exercises, and salvage through DPDO (1972 to present). The standard procedures for the final disposition of spent industrial solvents and cleaners has been (1) road oiling, fire department training exercises, landfill, and discharge to the sanitary sewer system (1950 to 1972); (2) road oiling, landfill, discharge to the sanitary sewer system, and salvage through DPDO (1972 to 1978); and (3) segregation and salvage through DPDO (1978 to present).

4. Interviews with past and present base employees resulted in the identification of 43 past disposal or spill sites at Eielson AFB and the approximate dates that these sites were used (see Figure 12, page IV-67 for site locations).

C. CONCLUSIONS

1. Information obtained through interviews with past and present base personnel and from base records, shop folders, and field observations indicates that hazardous wastes have been disposed of on Eielson AFB property in the past.

2. Due to the large fuel storage capacity, the long-standing refueling and defueling mission, and the extreme Alaskan climatic conditions at Eielson AFB, the potential for fuel spills is very high. A total of 14 fuel spill-related sites were identified. These sites include eight fuel spill sites, three sites where a hydrocarbon layer was found floating on the water table, and three sites where a POL-saturated ground surface was observed.

3. Evidence of environmental stress resulting from past fuel spills was observed at Sites No. 10, 15, and 19.

4. The potential for migration of hazardous contaminants is high because of (1) high ground-water table, (2) high soil permeability, (3) the absence of continuing impermeable confining strata in the unsaturated zone above the water table, and (4) low soil adsorption.

5. Table 1 presents a priority listing of the rated sites and their overall scores. The following sites were designated as areas showing the most significant potential (relative to other Eielson AFB sites) for environmental impact.

   a. POL Lake and E-2 POL Storage Area (Site No. 10)

   b. Current Base Landfill (Site No. 3)

   c. Potential Fuel-Saturated Area of the Base (Composite Site includes Sites No. 11, 19, 15, 18, 20, 13, 41, 36, 37, 17, 16, and 14)--The Composite Site is shown graphically

Table 1
PRIORITY LISTING OF DISPOSAL SITES

Site No.	Site Description	Overall Score
10	POL Lake and E-2 POL Storage Area	73
3	Current Base Landfill (1967 to present)	73
11	Fuel-Saturated Area	70
19	JP-4 Fuel Line Spill	67
32	Sewage Treatment Plant Spill Ponds	65
15	Multiproduct Fuel Line	65
9	Current Fire Department Training Area (1976 to present)	64
2	Old Base Landfill (1960 to 1967)	63
18	Fuel-Saturted Area, Old Boiler Plant	63
1	Original Base Landfill (1950 to 1960)	63
39	Asphalt Lake	63
20	Refueling Loop Fuel-Saturated Area	61
8	Original Fire Department Training Area (1948 to 1955)	61
13	E-4-1/2 Diesel Fuel Spill Area	60
41	Auto Hobby Shop	60
36	Drum Storage Site and Asphalt Mixing Area (late 1960s to mid-1970s)	60
37	Drum Storage Site and Asphalt Mixing Area (mid-1970s to present)	60
17	Canol Pipeline Spill	57
38	Waste POL Pit	56
16	MOGAS Fuel Line Spill	56
35	Asphalt Mixing Area and Asphalt Drum Disposal (early 1950s to late 1960s)	55
29	Drum Burial Site	54
24	Road Oiling-Gravel Haul Road	53
21	Road Oiling-Quarry Road	52
22	Road Oiling-Industrial Drive	52
23	Road Oiling-Manchu Road	51

Table 1--Continued

Site No.	Site Description	Overall Score
14	E-2, Railroad JP-4 Fuel Spill Area	51
25	E-6 Fuel Tank Sludge Burial Site	51
27	E-11 Fuel Tank Sludge Burial Site	51
6	Old Landfill (1959 to 1963)	51
42	Miscellaneous Storage and Disposal Area	51
26	E-10 Fuel Tank Sludge Burial Site	50
5	Old Army Landfill (1956 to 1959)	49
34	Sewage Treatment Plant Sludge Drying Beds	48
4	Old Army Landfill and EOD Area (1956 to 1959; late 1960s to present)	47

on Figure 14, page V-5. As a means of comparison, the Composite Site was rated and received an overall score of 75 (see page I-71 of Appendix I).

d. Sewage Treatment Plant Spill Ponds (Site No. 32)

e. Old Base Landfill (Site No. 2)

f. Original Base Landfill (Site No. 1)

6. The remaining sites (Sites No. 4, 5, 6, 8, 9, 21, 22, 23, 24, 25, 26, 27, 29, 34, 35, 38, 39, and 42) are not considered to present significant environmental concerns. Therefore, no Phase II work is recommended.

7. The sites which were not rated include Sites No. 7, 12, 28, 30, 31, 33, 40, and 43. No further actions are recommended at these sites.

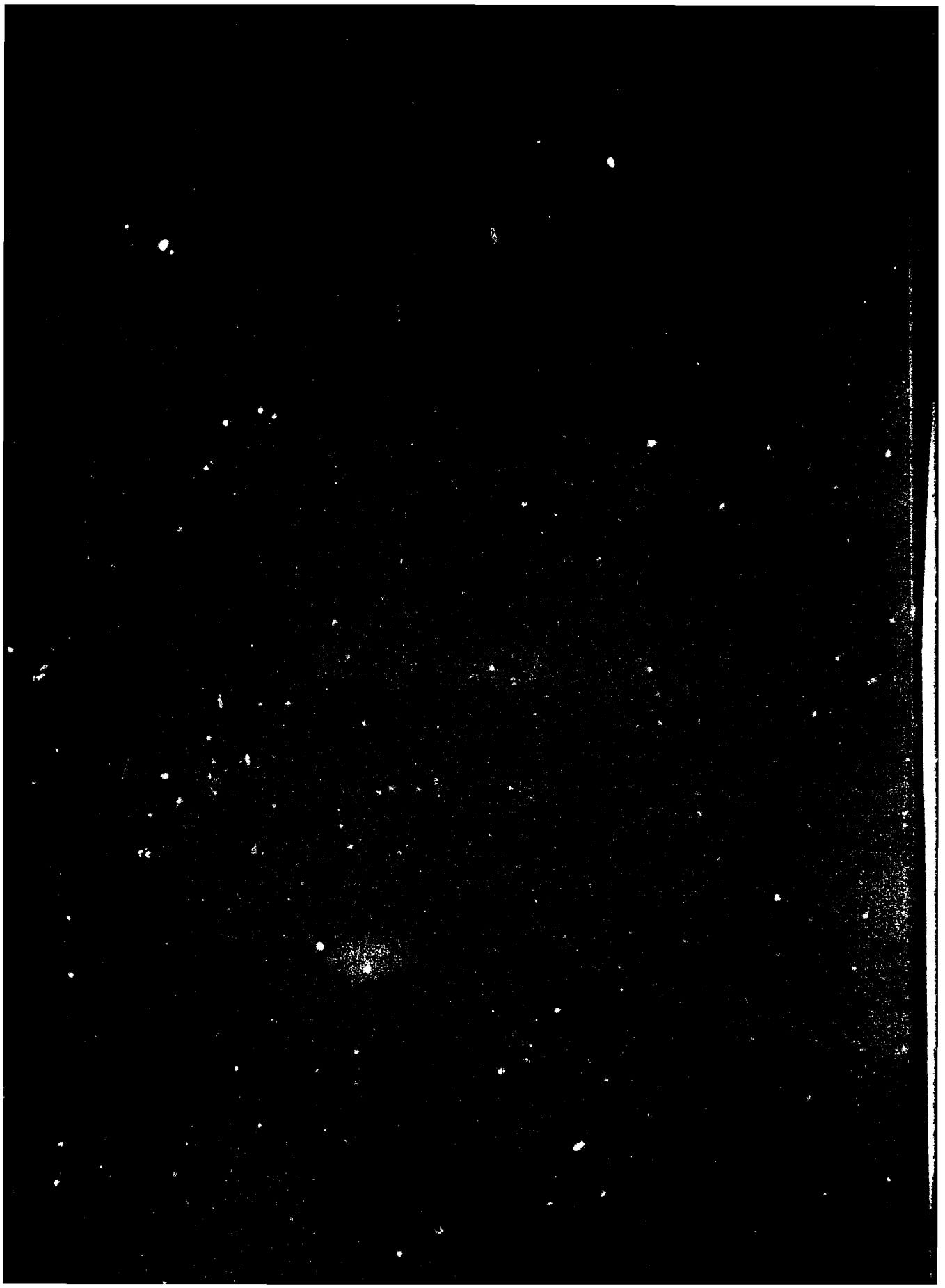
D. RECOMMENDATIONS

1. A limited Phase II monitoring program is recommended to confirm or rule out the presence and/or migration of hazardous contaminants. The details of the Phase II monitoring program are provided in Section VI, "Recommendations." The priority for monitoring at Eielson AFB is considered moderate, since no imminent hazard has been determined.

2. The final details of the monitoring program, including the exact locations of ground-water monitoring wells and soil sampling points, will be finalized as part of the Phase II program.

3. In the event that contaminants are detected, a more extensive field survey program should be implemented to determine the extent of contaminant migration.

4. In addition to the Phase II monitoring, additional recommendations were made for implementation as part of an in-house program. The details of the in-house program are also provided in Section VI, "Recommendations."



I. INTRODUCTION

A. BACKGROUND

The United States Air Force, due to its primary mission, has long been engaged in a wide variety of operations dealing with toxic and hazardous materials. Federal, state, and local governments have developed strict regulations to require that disposers identify the locations and contents of disposal sites and take action to eliminate the hazards in an environmentally responsible manner. The current Department of Defense (DoD) Installation Restoration Program (IRP) policy was directed by Defense Environmental Quality Program Policy Memorandum (DEQPPM) 81-5 dated 11 December 1981 and implemented by Air Force message dated 21 January 1982 as a positive action to ensure compliance of military installations with existing environmental regulations. DEQPPM 81-5 reissued and amplified all previous directives and memoranda on the Installation Restoration Program. DoD policy is to identify and fully evaluate suspected problems associated with past hazardous material disposal sites on DoD facilities, to control the migration of hazardous contamination, and to control hazards to health and welfare that may have resulted from these past operations. The IRP will be a basis for response actions on Air Force installations under the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980.

To conduct the Installation Restoration Program Records Search for Eielson AFB, the AFESC retained CH2M HILL on June 9, 1982, under Contract No. F0863780 G0010 6001 using funding provided by the Alaskan Air Command (AAC).

The records search comprises Phase I of the DoD Installation Restoration Program and is intended to review installation records to identify possible hazardous waste-contaminated sites and to assess the potential for contaminant

migration from the installation. Phase II (not part of this contract) consists of follow-on field work as determined from Phase I. Phase II consists of a preliminary survey to confirm or rule out the presence and/or migration of contaminants and, if necessary, additional field work to determine the extent and magnitude of the contaminant migration. Phase III (not part of this contract) consists of a technology base development study to support the development of project plans for controlling migration or restoring the installation. Phase IV (not part of this contract) includes those efforts which are required to control identified hazardous conditions.

B. AUTHORITY

The identification of hazardous waste disposal sites at Air Force installations was directed by Defense Environmental Quality Program Policy Memorandum 81-5 (DEQPPM 81-5) dated 11 December 1981, and implemented by Air Force message dated 21 January 1982, as a positive action to ensure compliance of Air Force installations with existing environmental regulations.

C. PURPOSE OF THE RECORDS SEARCH

DoD policy is to identify and fully evaluate suspected problems associated with past hazardous material disposal sites and spill sites on DoD facilities, control the migration of hazardous contamination from such facilities, and control hazards to health or welfare that may have resulted from these past operations. The existence and potential for migration of hazardous material contaminants was evaluated at Eielson AFB by reviewing the existing information and conducting an analysis of installation records. Pertinent information includes the history of operations, the geological and hydrogeological conditions which may contribute to the

migration of contaminants, and the ecological settings which indicate environmentally sensitive habitats or evidence of environmental stress.

D. SCOPE

The records search program included a pre-performance meeting, an onsite base visit, a review and analysis of the information obtained, and preparation of this report.

The pre-performance meeting was held at Eielson AFB, Alaska, on July 1, 1982. Attendees at this meeting included representatives of AFESC, USAF OEHL, Alaskan Air Command, Eielson AFB, and CH2M HILL. The purpose of the pre-performance meeting was to provide detailed project instructions, to provide clarification and technical guidance by AFESC, and to define the responsibilities of all parties participating in the Eielson AFB records search.

The onsite base visit was conducted by CH2M HILL from August 2 through August 6, 1982. Activities performed during the onsite visit included a detailed search of installation records, a ground tour of the installation, and interviews with 27 past and present base personnel. At the conclusion of the onsite base visit, the base commander was briefed on the preliminary findings. The following individuals comprised the CH2M HILL records search team:

1. Mr. Gary Eichler, Project Manager/Hydrogeologist (M.S. Engineering Geology, 1974)

2. Mr. Greg McIntyre, Assistant Project Manager/ Environmental Engineer (M.S. Environmental and Water Resources Engineering, 1981)

3. Ms. Jane Dykzeul Gendron, Ecologist (B.A. Biology, 1976)

Resumes of these team members are included in Appendix A. Government agencies were contacted for information and relevant documents. Appendix B lists the agencies contacted.

Individuals from the Air Force who assisted in the Eielson AFB records search included the following:

1. Mr. Bernard Lindenberg, AFESC, Program Manager, Phase I

2. Major Gary Fishburn, USAF OEHL, Program Manager, Phase II

3. Mr. James Hostman, AAC, Command Representative

4. Lt. John Stevens, Eielson AFB, Environmental Coordinator

5. Capt. Richard Brewer, Eielson AFB, Bioenvironmental Engineer

E. METHODOLOGY

The methodology utilized in the Eielson AFB records search is shown graphically on Figure 1. First, a review of past and present industrial operations is conducted at the base. Information is obtained from available records such as shop files and real property files, as well as interviews with past and present base employees from the various operating areas of the base. The information obtained from interviewees on past activities is based on their best recollection. A list of 27 interviewees from Eielson AFB, with areas of knowledge and years at the installation, is given in Appendix C.

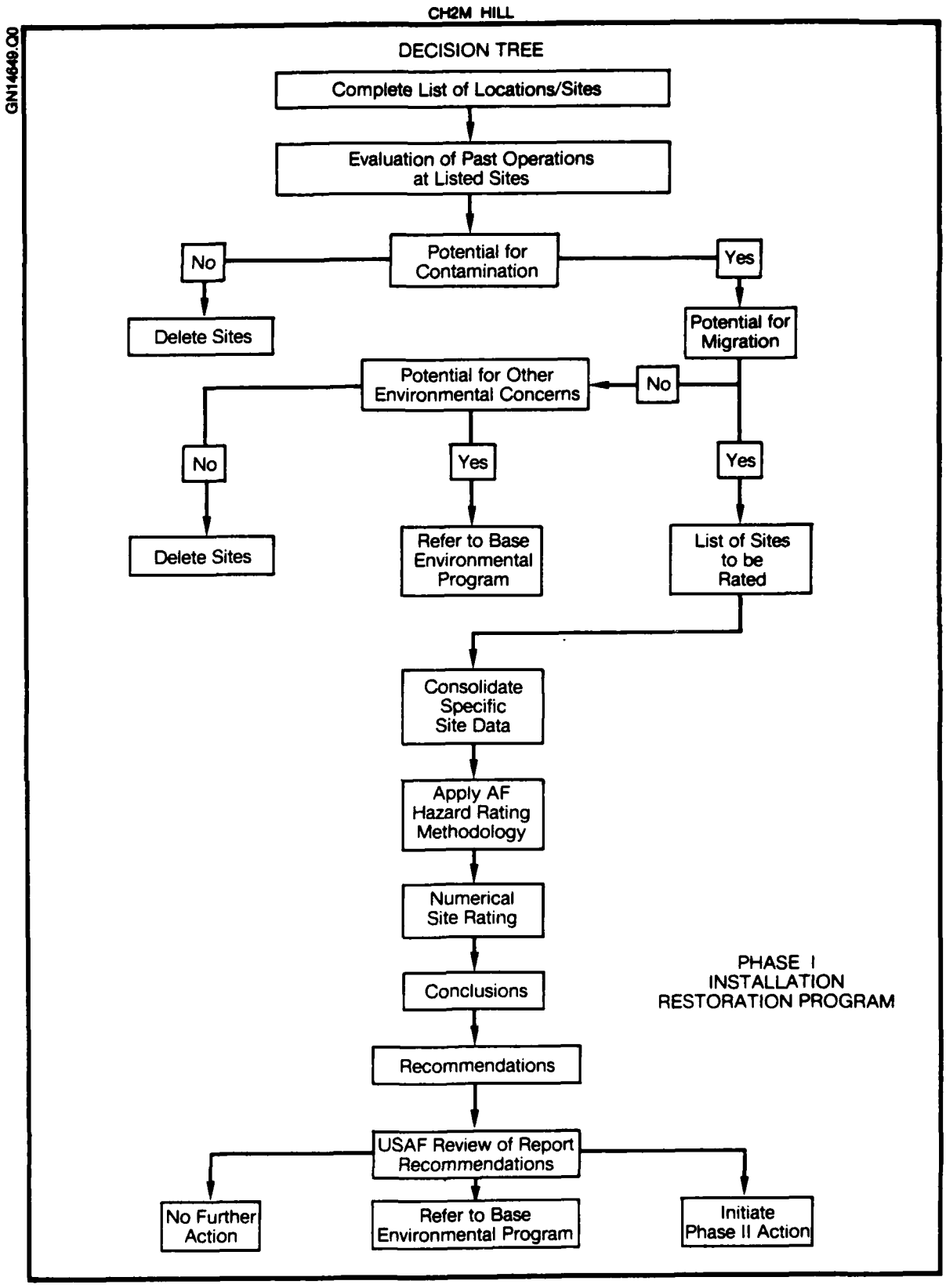


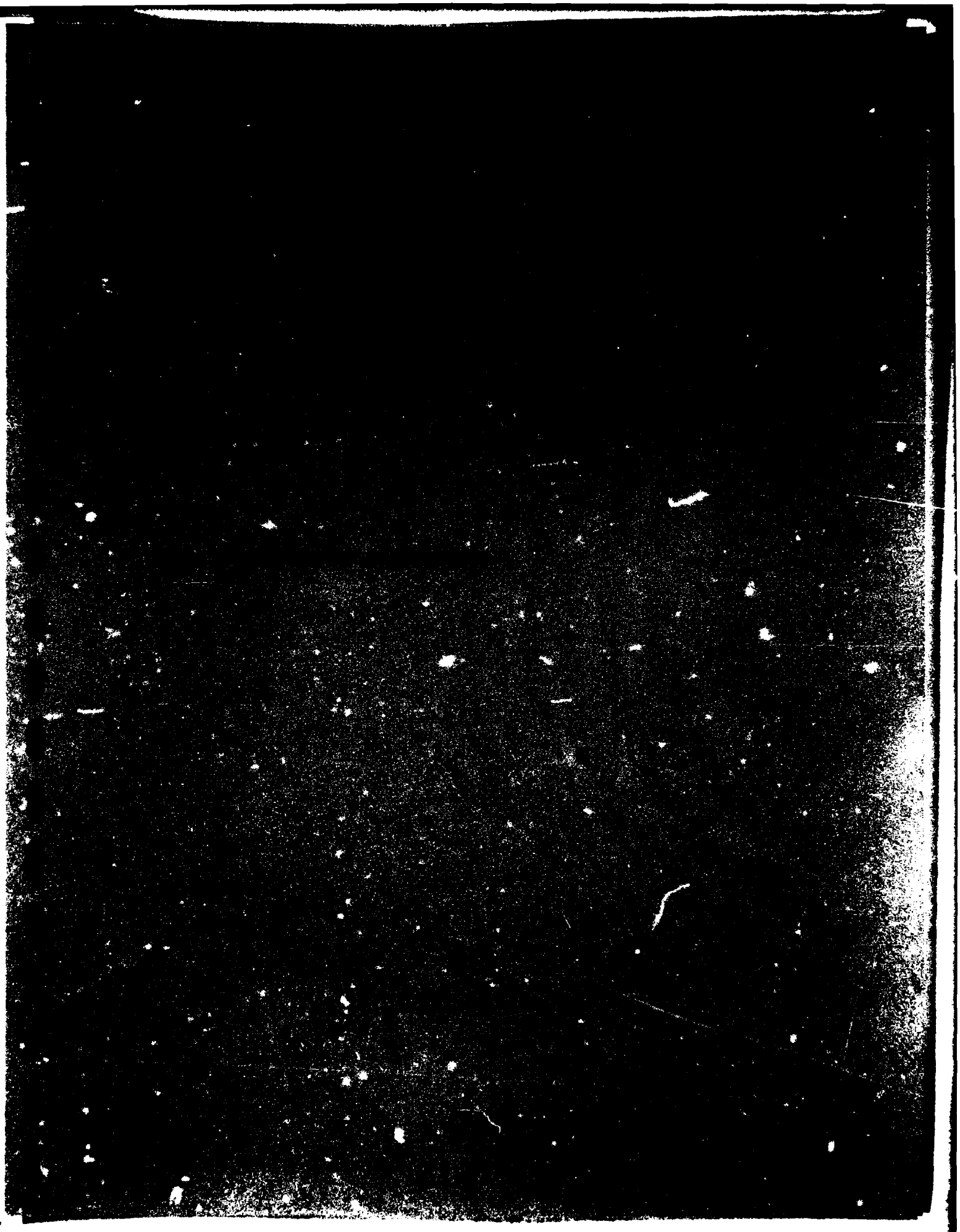
FIGURE 1. Records search methodology.

The next step in the activity review process is to determine the past management practices regarding the use, storage, treatment, and disposal of hazardous materials from all the industrial operations on the base. Included in this part of the activity review is the identification of past landfill sites and burial sites, as well as other possible sources of contamination such as major PCB or solvent spills or fuel-saturated areas resulting from significant fuel spills or leaks.

A general ground tour of identified sites is then made by the records search team to gather site-specific information including evidence of environmental stress and the presence of nearby drainage ditches or surface-water bodies. These water bodies are inspected for any evidence of contamination or leachate migration.

A decision is then made, based on all of the above information, as to whether a potential exists for hazardous material contamination from any of the identified sites. If not, the site is deleted from further consideration. If minor operations and maintenance deficiencies are noted during the investigations, the condition is reported to the Base Environmental Coordinator for remedial action.

For those sites at which a potential for contamination is identified, the potential for migration of this contamination is evaluated by considering site-specific soil and ground-water conditions. If there is no potential for contaminant migration, but other environmental concerns were identified, the site is referred to the base environmental monitoring program for further action. If no further environmental concerns are identified, the site is deleted from consideration. If the potential for contaminant migration is identified, then the site is rated and prioritized using the site rating methodology described in Appendix H, "Hazard Assessment Rating Methodology."



II. INSTALLATION DESCRIPTION

A. LOCATION

Eielson AFB is located in the Tanana River Valley in Interior Alaska approximately 23 miles southeast of Fairbanks. The base, which is located on approximately 19,790 acres of land, is isolated from any major urban area and is essentially a self-contained community. The location map of Eielson AFB is shown on Figure 2, and the site map of Eielson AFB is shown on Figure 3.

B. ORGANIZATION AND MISSION

Eielson AFB was originally a satellite installation of Ladd Field called Mile 26. The installation received its name because of its location on Mile 26 of Old Richardson Highway. Initial construction on Mile 26 began in 1943, and the original base was completed in 1944. As the end of World War II approached, the field was deactivated and then later reopened in 1946 as a future strategic base. The majority of the base facilities, including the expanded runway, were built during the major construction program, which lasted from 1947 to 1954. The base was officially named Eielson AFB in honor of Carl Ben Eielson, a pioneer Alaskan and Arctic aviator, in February 1948.

The primary mission of Eielson AFB has remained relatively unchanged since the early 1960s. The host unit at Eielson AFB was the 5010th Combat Support Group until the latter part of 1981. At that time, the 5010th Combat Support Group was reorganized and redesignated the 343rd Composite Wing. The mission of the 343rd Composite Wing is to provide trained and equipped tactical air support forces for air strike control and liaison in direct support of ground elements assigned/attached to the Alaskan Air Command.

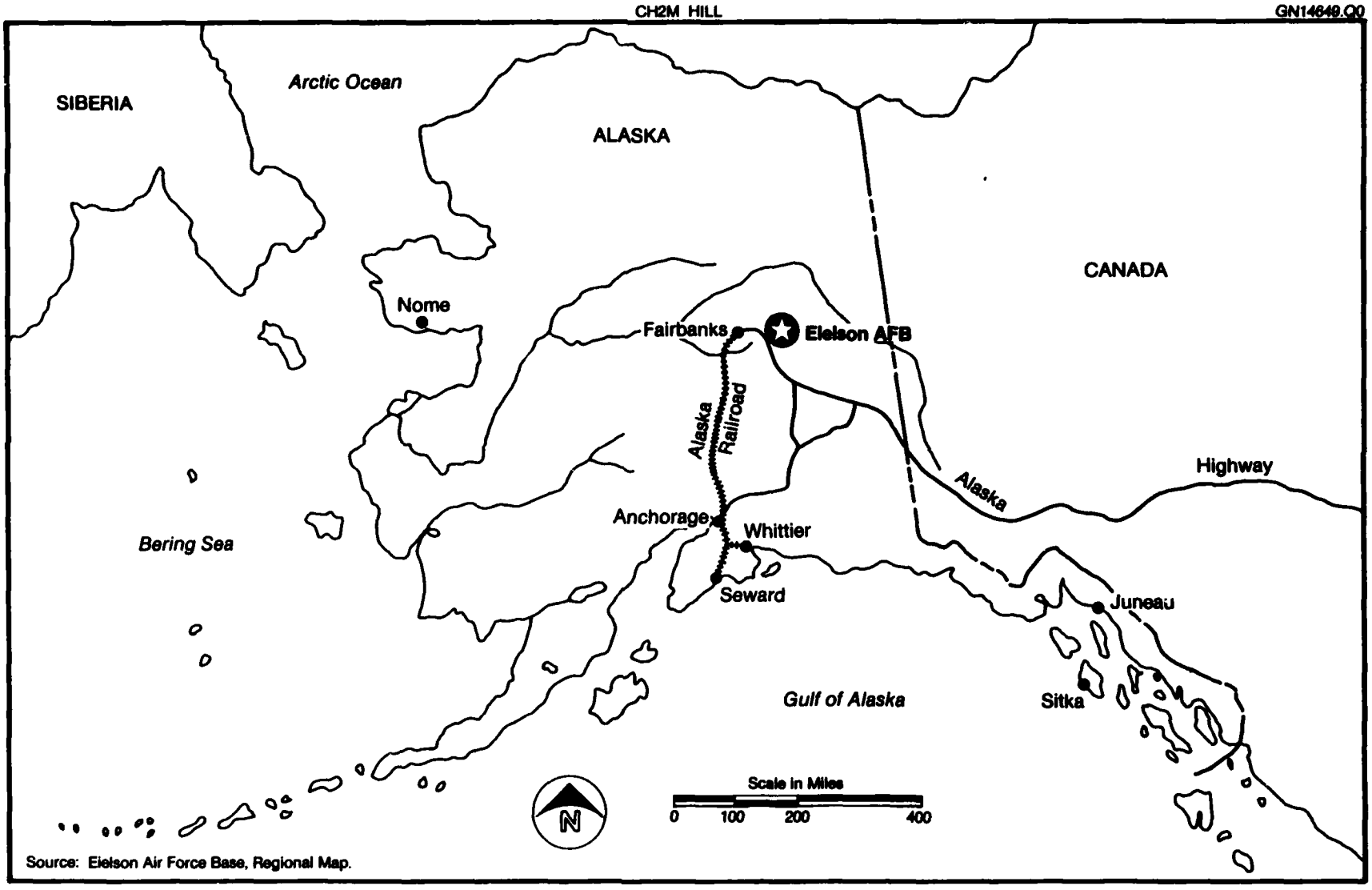


FIGURE 2. Location map of Eielson AFB.

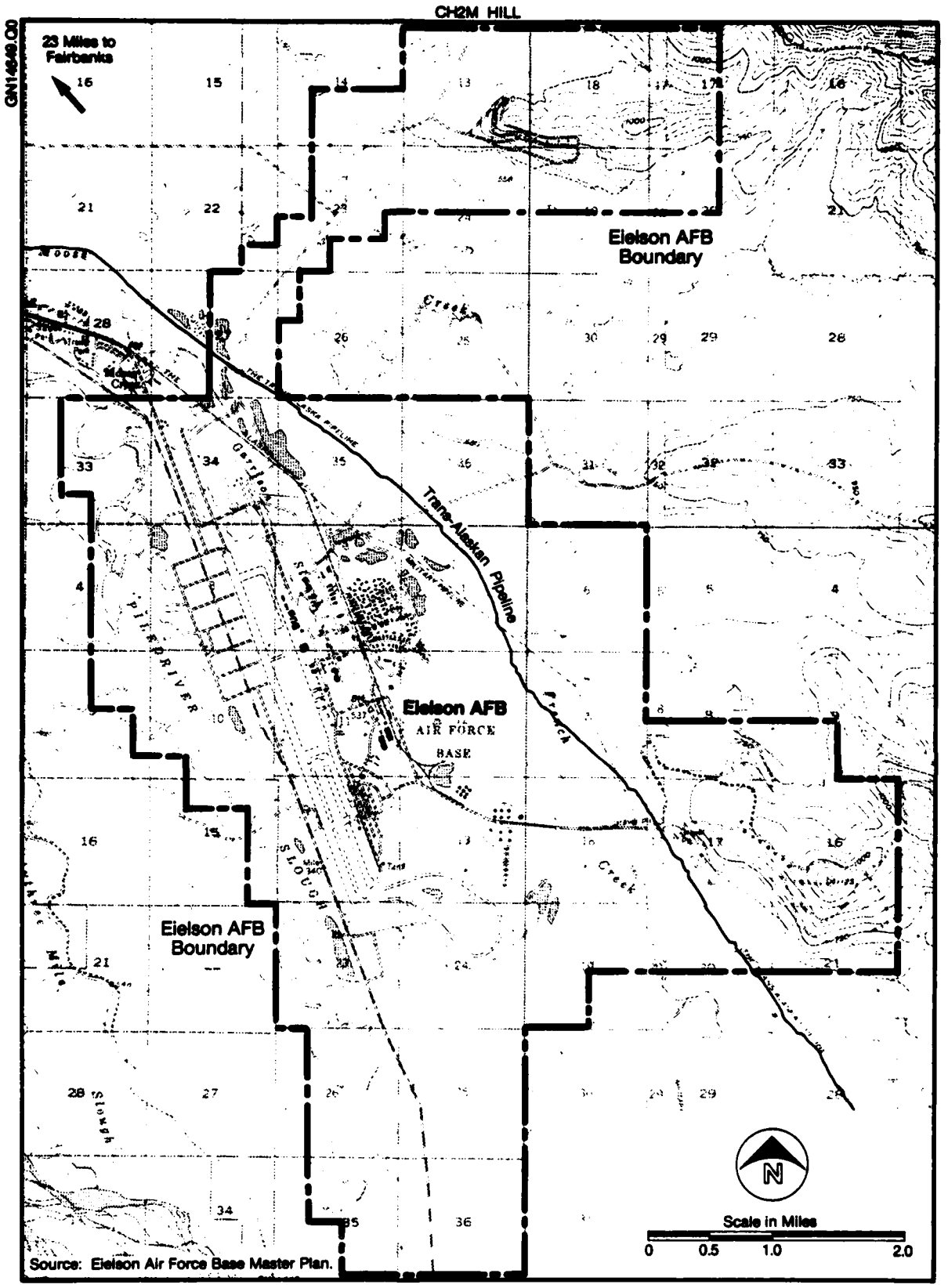


FIGURE 3. Site map of Eielson AFB.

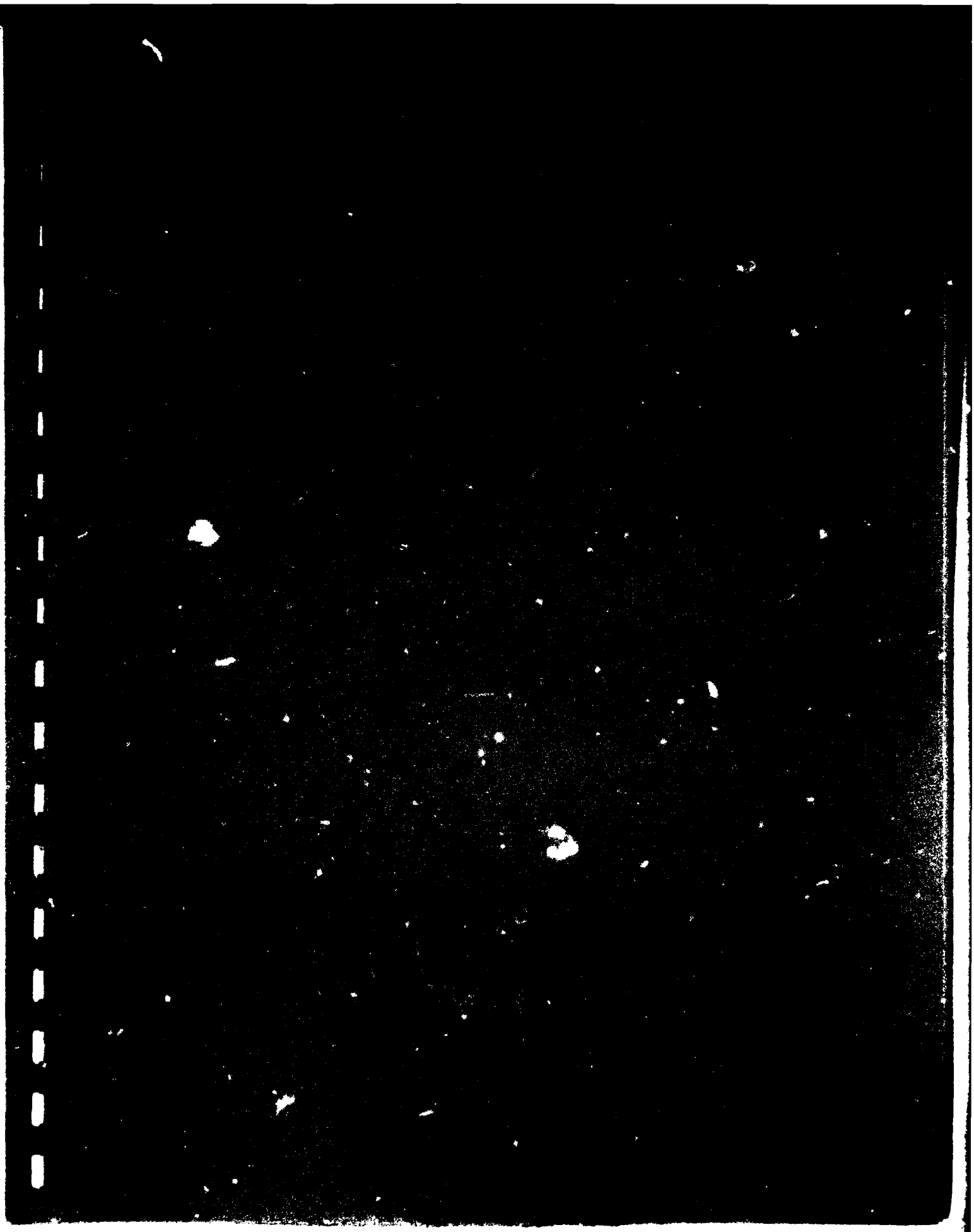
There are approximately 32 aircraft (A-10, O-2, and KC-135) currently assigned to Eielson AFB. The total work force on Eielson AFB numbers approximately 3,500, which includes 3,100 military and 400 civilian employees.

The organizations and major tenants at Eielson AFB are listed below:

- o 343rd Composite Wing
  - 343rd Civil Engineering Squadron
  - 343rd Combat Support Group
  - 343rd Consolidated Aircraft Maintenance Squadron
  - 343rd Security Police Squadron
  - 343rd Supply Squadron
  - 343rd Transportation Squadron
  - 18th Tactical Fighter Squadron
  - USAF Clinic
  - 25th Tactical Air Support Squadron
- o AFOSI Detachment 8101
- o Defense Supply Agency
- o Det. 1 3636 Combat Crew Training Wing
- o Det. 2 11th Weather Squadron

- Det. 1 5000 Contracting Squadron
- Det. 422 Air Force Audit Agency
- Det. 460 AFTAC
- OL-A Det. 5 1369th Audiovisual Squadron
- OL-AA 5050th Management Engr. Flt.
- OL-AA Det. 1 AFCOMS
- OL-B 616th Aerial Port Squadron
- 71st Air Rescue and Recovery Squadron
- 5059th Air Postal Squadron
- 6th Strategic Wing
- 6th Consolidated Aircraft Maintenance Squadron
- 24th Strategic Reconnaissance Squadron
- 1955th Communications Squadron
- 6985th Electronics Security Squadron

A more detailed description of the base history and its mission is included in Appendix D.



III. ENVIRONMENTAL SETTING

A. METEOROLOGY

Eielson AFB is located in the continental climatic zone, which covers the interior of Alaska. Generally, this zone is characterized by great diurnal and annual temperature variations, low precipitation, and low humidity.

Alaska is located at a high latitude, and sun angle is comparatively low, especially in the winter. As a result, very little solar energy is received during the winter months. Warm winds generated in lower latitudes (the Westerlies) circulate within the state, counteracting the deficit and moderating temperatures. Alaska receives the most solar energy during the summer months when northern latitude is tilted toward the sun. However, much of this energy never reaches the surface; it is absorbed or reflected by the extensive cloud cover.

The climate data recorded at Eielson AFB from 1946 through 1981 shows that the average summer temperatures range between 49° and 61°F. In the winter, average temperatures are between 29° and -14°F. Extreme temperatures recorded during this time period at Eielson AFB were 93°F in July and -64°F in January.

Annual precipitation in this area averages 14 inches, which includes 70 inches of snow. Average monthly precipitation ranges from 0.5 inch to 2.4 inches, with the higher precipitation rates occurring during the summer months. The evaporation rate is approximately 14 inches per year. Therefore, the net precipitation for the Eielson AFB area (mean annual precipitation minus mean annual evaporation) is approximately 0 inches per year. Table 2 shows average, maximum, and minimum temperatures and amount of precipitation recorded at Eielson AFB from 1946 through 1981.

Table 2
METEOROLOGICAL DATA AT EIELSON AFB

Parameter	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Temperature (°F)												
Extreme Maximum	49	50	52	74	92	93	92	88	82	68	50	45
Extreme Minimum	-64	-60	-50	-26	4	31	36	25	12	-36	-44	-61
Average	-14	-5	8	29	47	58	61	56	45	24	2	-11
Precipitation (inches)												
Maximum	4.1	2.5	2.7	4.4	2.0	4.2	5.2	7.5	3.1	3.8	2.7	2.6
Average	.9	.7	.6	.5	.8	1.6	2.4	2.4	1.4	1.1	.8	.8
Mean Snowfall	11	9	6	5	1	T	0	T	2	12	12	12

Source: AWS Climatic Brief, Eielson AFB
October 1946-November 1977, Eielson AFB Climatic Brief 1981 update.

Note: Period of record: 1946-1981.

B. GEOLOGY

Eielson AFB is located on the floodplain of the Tanana River approximately 23 miles southeast of Fairbanks, Alaska. The developed portion of the base lies within the Tanana-Kuskokwim Lowland Physiographic Province of the Yukon Region of Alaska (see Figure 4).

Topography at Eielson AFB is flat and somewhat featureless within the developed portion of the base. This part of the base is essentially a smooth, glacio-fluvial outwash plane occurring at the base of the Alaska Range, which lies approximately 100 miles south of Eielson AFB. Parts of the undeveloped portions of the base extend into the Yukon-Tanana Upland Physiographic Province (see Figure 4). This area is characterized by rounded, even-topped ridges with gentle side slopes and broad undulating divides with flat-topped spurs.

Elevations within the developed portion of the base range from 550 to 525 feet above mean sea level (msl), sloping downward to the north-northwest. Elevations in the hilly, eastern portion of the base are as high as 1,125 feet above msl. This portion of the base is and has been, with the exception of some fuel storage, undeveloped.

The surficial deposits in the vicinity of Eielson AFB consist primarily of sandy and gravelly loam. Most of these materials were deposited by glacial outwash streams originating in the mountains to the south and east. Soils near main streams are generally gravelly, with permafrost (permanently frozen ground) deep or absent. Those soils located further away from main streams are silty and have a shallow occurrence of permafrost. Soils occurring in the lowland or developed portion of Eielson AFB consist primarily of the Salchaket series, which are predominantly sandy loam underlain by a thick layer of coarse sand and gravel.

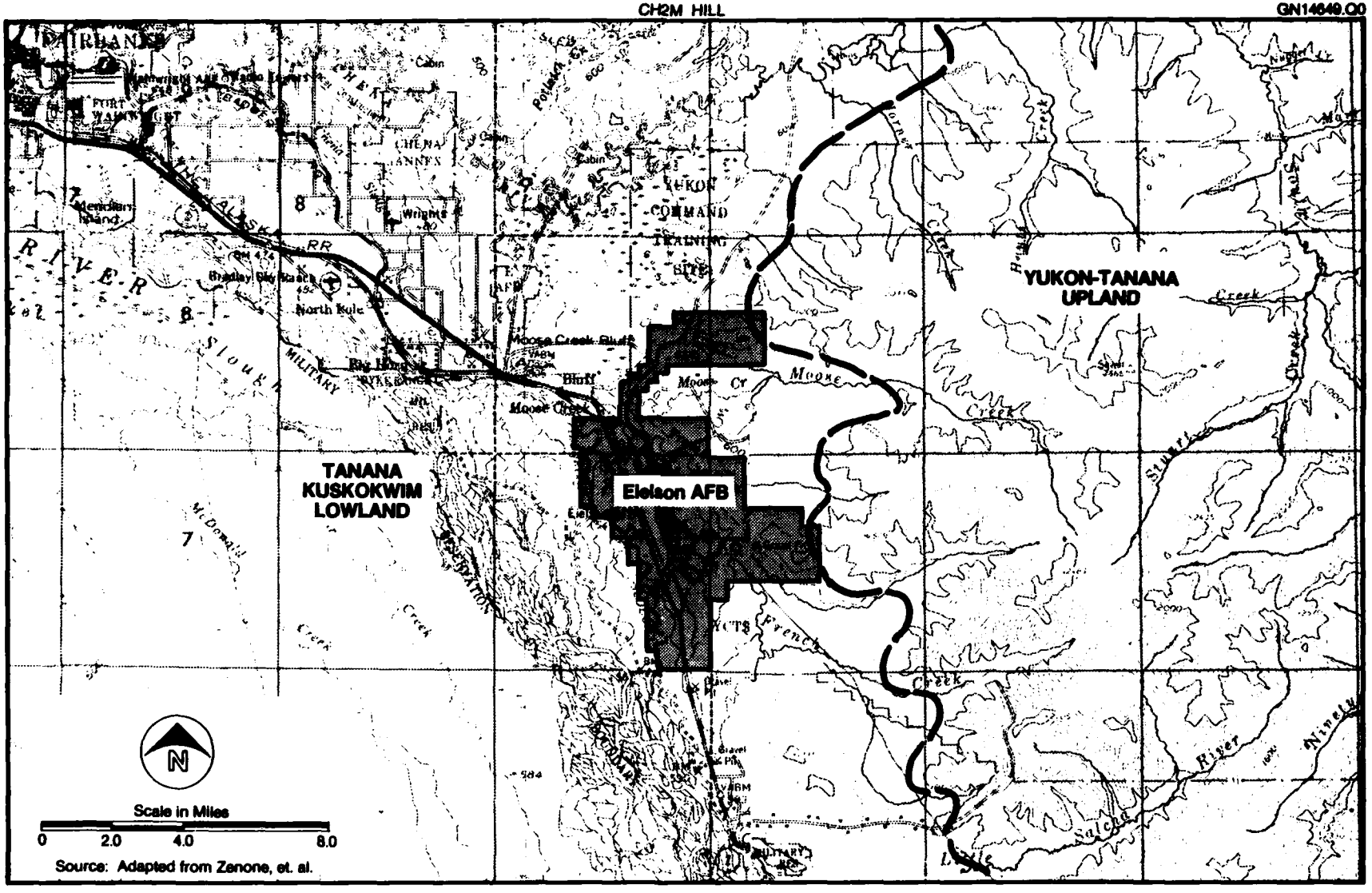


FIGURE 4. Physiographic map.

Permeabilities within the soil layers at Eielson AFB down to a depth of 60 inches range from 3×10^{-3} to greater than 1×10^{-2} cm/sec; this is a moderately high permeability.

Underlying the surficial soils at Eielson AFB are interbedded layers of sand and gravel with cobbles up to 8 inches in diameter. The amount of silt in these deposits varies but is generally less than 10 percent. The depositional origin of these materials, like the surficial deposits, is glacial outwash and associated alluvial stream deposits. The material was washed down from higher elevations during spring thaw and summer rains. The coarser material is deposited in the stream bed, and progressively finer material is deposited away from the channel. These deposits are often reworked and remixed as stream courses change. The resulting formation is well graded and should act as a good filter for percolating ground water. Although this formation would act as a filter for suspended particulate matter, it would have no effect on organic compounds.

The unconsolidated strata described above is approximately 200 to 300 feet thick in the vicinity of Eielson AFB and overlies a Precambrian metamorphic quartz-mica schist known as the Birch Creek Schist. This is the regional basement or bedrock and characteristically has a weathered surface of varying depth. Figure 5 illustrates the general geology exposed at or near the surface, while Figure 6 is a typical geologic log from a well (Well No. 2) located on Eielson AFB.

C. HYDROLOGY

Eielson AFB is located approximately 2 miles east of the Tanana River, a major glacial outwash stream draining Interior Alaska.

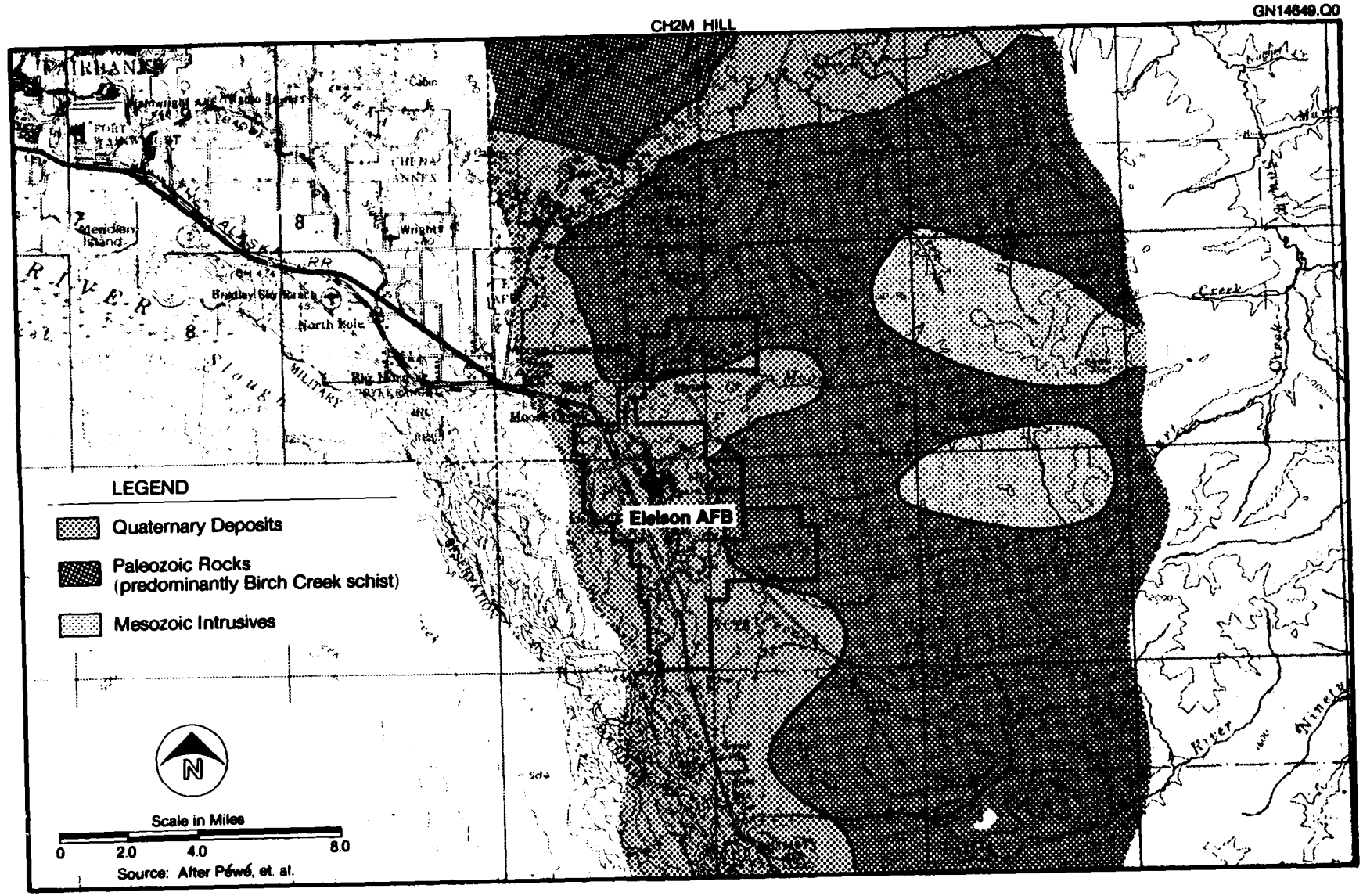


FIGURE 5. Geologic map.

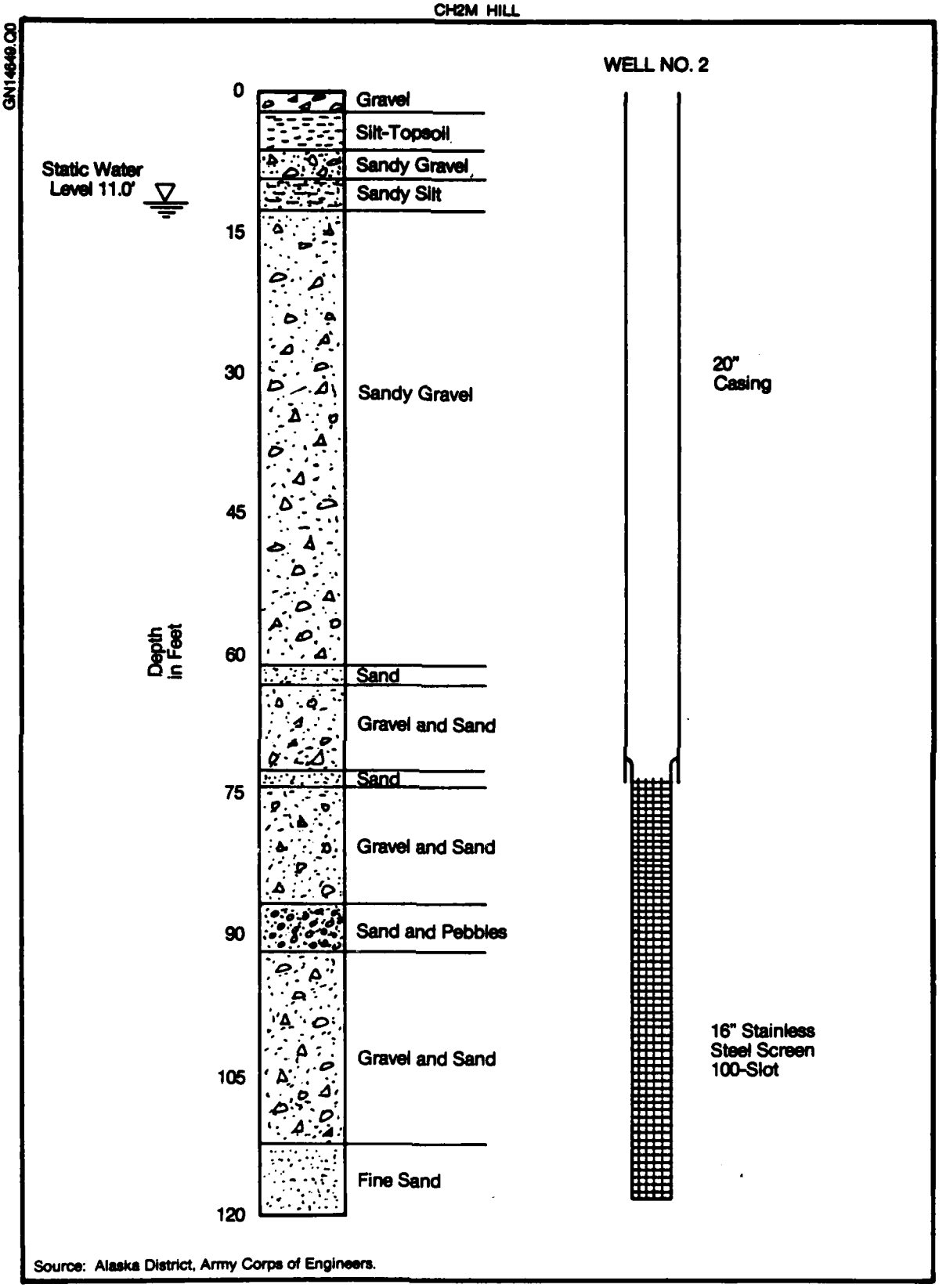


FIGURE 6. Typical well construction detail and geologic log at Eielson AFB.

The Tanana River is a braided stream formed by the junction of the Chisana and Nebesna Rivers originating in the higher elevations on the northern slopes of the Wrangell Mountains near the Canadian border. A river is defined as a permanent surface-water course, flowing in a definite channel toward the sea. The headwaters of the river begin in the snow fields and glaciers as meltwater and carry an increasingly larger load of sediment as they flow downstream. The Tanana River drainage basin is approximately 44,000 square miles. Major floods have occurred in the basin as a result of rainfall and snowmelt. Floods have occurred when a sudden rise in temperature is combined with a warm rain or saturated snow. Generally, major floods occur during spring breakup (thaw). The largest recorded flood at Fairbanks, which occurred in 1967, inundated almost the entire city. During this flood event, the Tanana River rose to an elevation of approximately 520 feet above msl at Eielson AFB, somewhat lower than runway elevations (≈540 ft above msl).

Peak runoff occurs during the summer months as a result of snowmelt and rainfall. Rainfall is generally highest in July and August averaging 2.4 inches for each month. Flooding potential at Eielson from major streams is unlikely. Local flooding may occur where surface permeabilities are low or water tables high.

Surface drainage at Eielson AFB is generally north-northwest parallel to the Tanana River (also the runway) (see Figure 7). Several small sloughs or creeks pass through the base and discharge eventually to the Tanana River. A slough is defined as a sluggish channel of water such as a small side channel of a river. A creek is defined as a surface stream of water normally smaller than and often tributary to a river. Garrison Slough passes directly through the developed portion of the base and consists

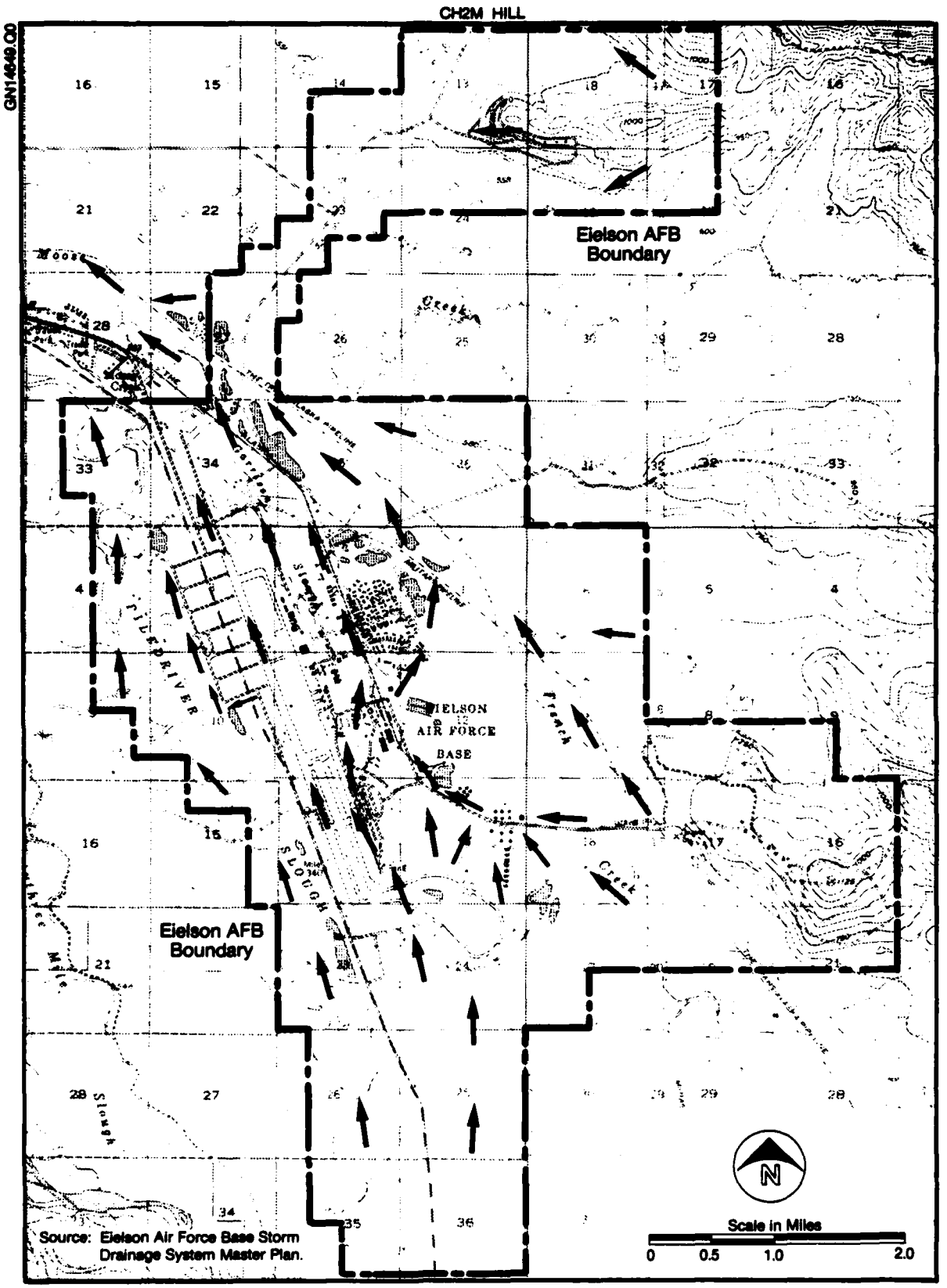


FIGURE 7. Surface drainage map.

primarily of man-made drainage ditches which discharge to Moose Creek. French Creek drains the east portion of the lowland side of the base. Piledriver Slough drains the undeveloped portion of the base on the west side of Richardson Highway.

The availability of ground water in the vicinity of Eielson AFB is governed by past stream deposition. The central portion of the main stream channels are generally quite permeable. Figure 8 illustrates the availability of ground water in the vicinity of the Eielson AFB and shows that most of the developed portion of the base is located in an area of high ground-water availability (well yields between 1,000 to 3,000 gpm).

Ground water occurs as a water table aquifer at Eielson AFB. The static water level is approximately 5 feet below land surface (bls) or at an elevation of approximately 535 feet above msl. This aquifer is contained in the unconsolidated sands and gravels underlying the site. The regional hydraulic gradient is probably close to the slope of the land surface within the developed portion of the base or approximately 4 to 6 ft/mile. This regional hydraulic gradient is relatively low, resulting in a generally slow movement of ground water in the area. However, the local ground-water movement adjacent to surface recharge areas, such as rivers, creeks, sloughs, lakes, or water-filled borrow pits, may be much faster because the hydraulic gradient adjacent to recharge areas is much higher than the regional gradient. This effect would be measurable only immediately adjacent to recharge areas, since the velocity (energy) would be quickly dissipated by the permeable aquifer. The direction of regional flow is north-northwest parallel to the surface drainage. The source of recharge to the aquifer is the Tanana River, its tributaries, and vertical percolation of rainfall and snowmelt.

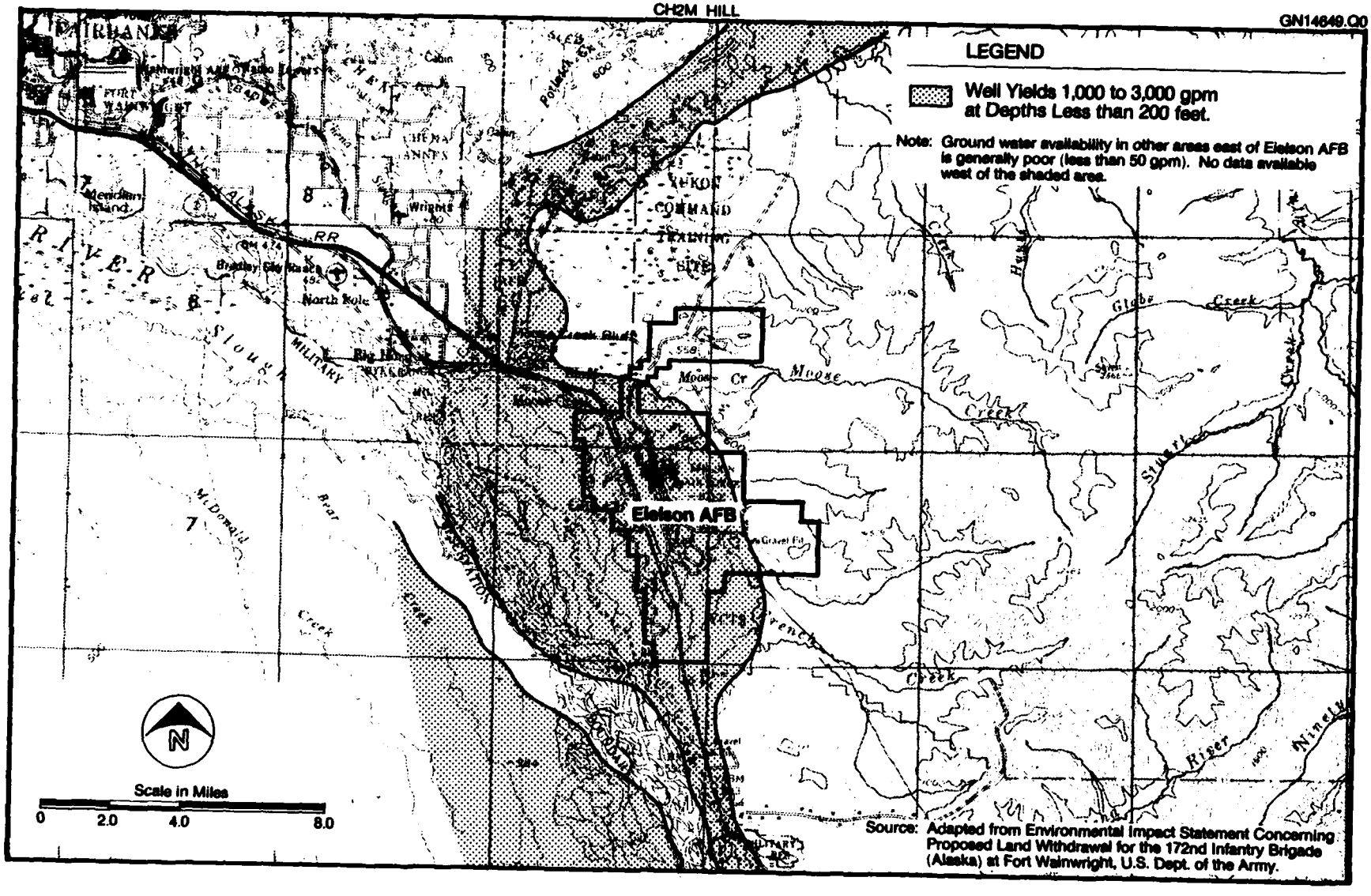


FIGURE 8. Availability of ground water in the vicinity of Eielson AFB.

The aquifer is approximately 250 feet thick at Eielson AFB and probably extends into the Precambrian Basement or Bedrock (Birch Creek Schist) that underlies the area. The water quality is very good throughout the area, except for the occurrence of high iron in some wells. Table 3 presents water quality analyses from wells in use at Eielson AFB. The aereal extent of the aquifer is limited to the broad valley of the Tanana River Basin which is approximately 45 to 50 miles wide at Eielson AFB. Major recharge to the aquifer locally is from the Tanana River; however, rainfall also enters the aquifer as infiltration directly through the permeable soils. Figure 9 illustrates a general geologic cross section through Eielson AFB. Also illustrated on this figure is the relationship between stream recharge and permafrost. The warmer recharge water from streams keeps the ground thawed, creating "holes" in the permafrost table.

The water for Eielson AFB is supplied by wells completed into this aquifer. The wells are from 4 to 18 inches in diameter and are approximately 100 feet deep. They are screened and gravel packed, with typical specific capacities of 50 to 400 gpm per foot of drawdown. Table 4 lists construction details of wells at Eielson AFB. Well locations are illustrated on Figure 10.

Due to the proximity of the developed portion of the base to the Tanana River and other streams, there is little permafrost underlying the area. During the construction of Well No. 22, a permafrost lens (approximately 50 feet thick) was encountered at approximately 30 feet bls. In addition, some frozen ground probably occurs between French Creek and the upland areas on the east portion of the base. The low silt content in the formations allows for the free movement of water within the aquifer. The high transmissivity and

Table 3
SELECTED CHEMICAL ANALYSES OF GROUND WATER
FROM WELLS AT EIELSON AFB

Parameter		
Sampling date	September 7, 1965[a]	August 1982[b]
Major aquifer	Gravel	Gravel
Well depth (feet)	115.0	96
Silca-SiO_2 (mg/l)	28.0	--
Iron-Fe (mg/l)	7.11	4.1
Calcium-Ca (mg/l)	38.0	29.8
Magnesium-Mg (mg/l)	9.7	9.0
Sodium-Na (mg/l)	7.5	4.0
Potassium-K (mg/l)	0.8	--
Bicarbonate-HCO_3 (mg/l)	166.0	--
Sulfate-SO_4 (mg/l)	15.0	--
Chloride-Cl (mg/l)	4.6	--
Fluoride-F (mg/l)	0.1	<0.1
Nitrate-NO_3 (mg/l)	0.0	<0.1
Dissolved solids-residue on evaporation at 180°C (mg/l)	135.0	202
Carbonate Hardness-$CaCO_3$ (mg/l)	135.0	109
Noncarbonate Hardness-$CaCO_3$ (mg/l)	0.0	--
Specific conductance (micromhos at 25°C)	290.0	--
pH	7.5	--
Color (units)	15.0	--
Alkalinity	--	139

[a] Source: Environmental Impact Statement Concerning Proposed Land Withdrawal for the 172nd Infantry Brigade (Alaska) at Ft. Wainwright, U.S. Department of the Army, October 1980.

[b] Source: Eielson Air Force Base, Bioenvironmental Engineering Files.

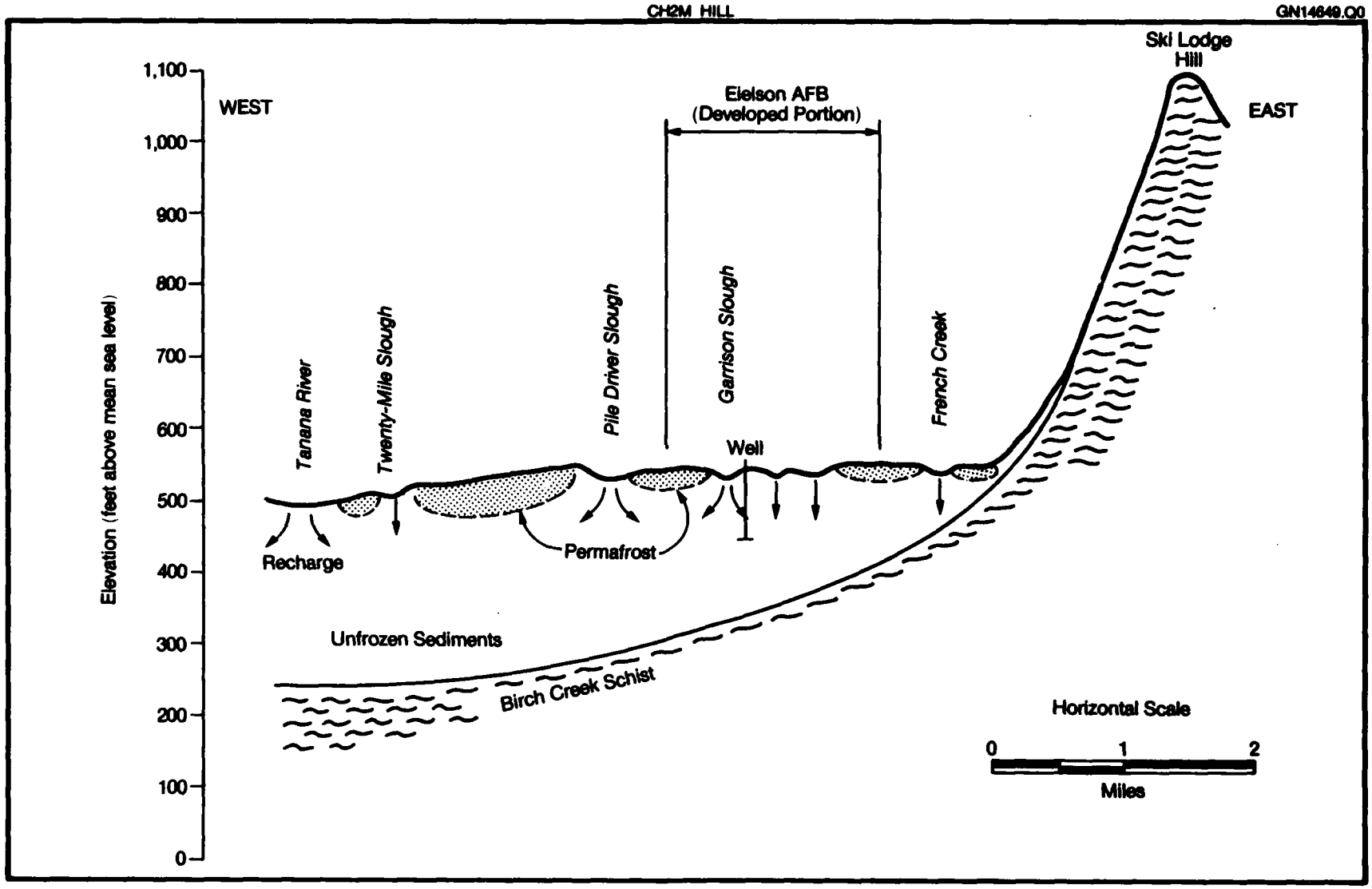
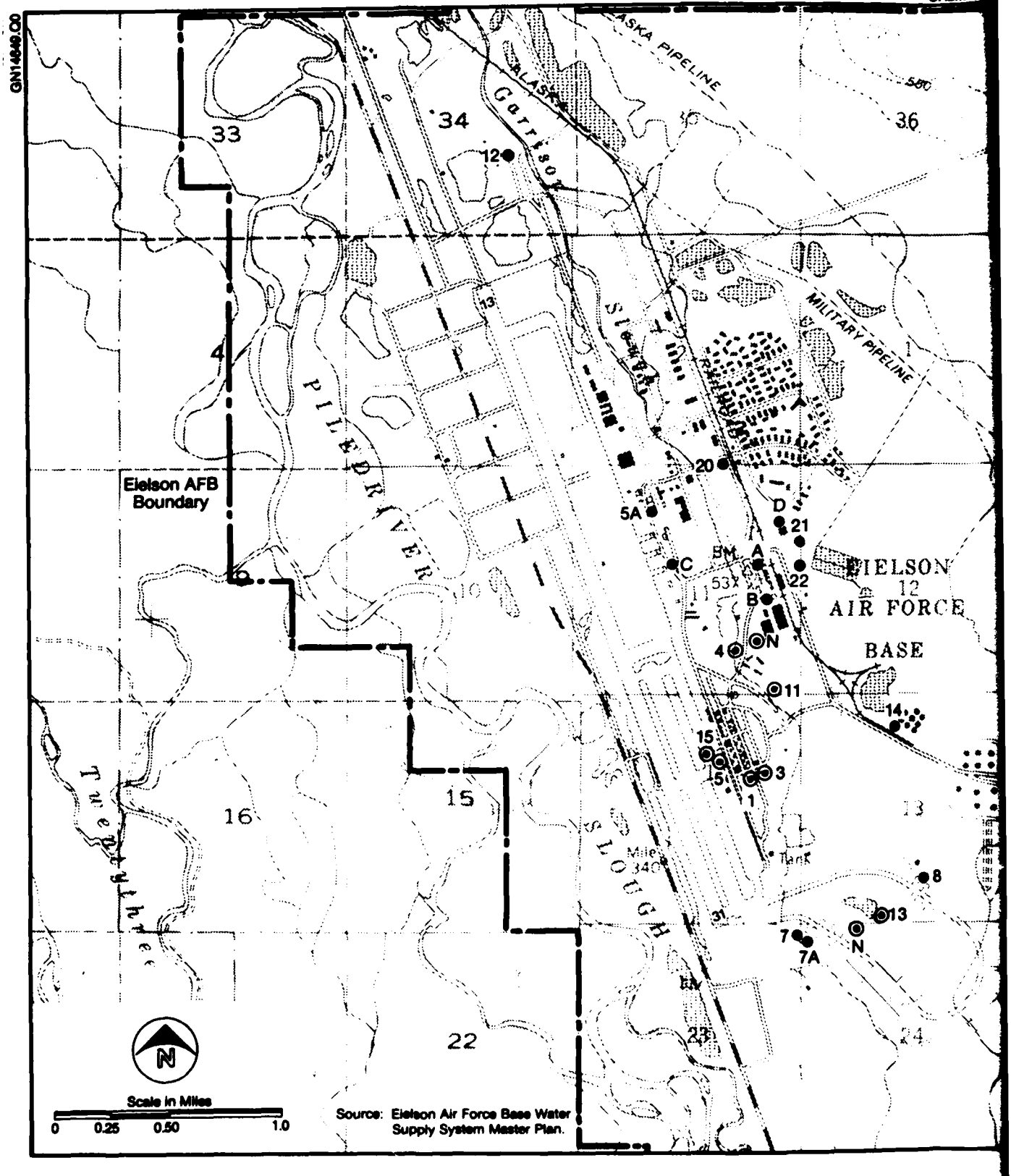


FIGURE 9. Generalized west-east geologic cross section illustrating typical occurrence of permafrost.

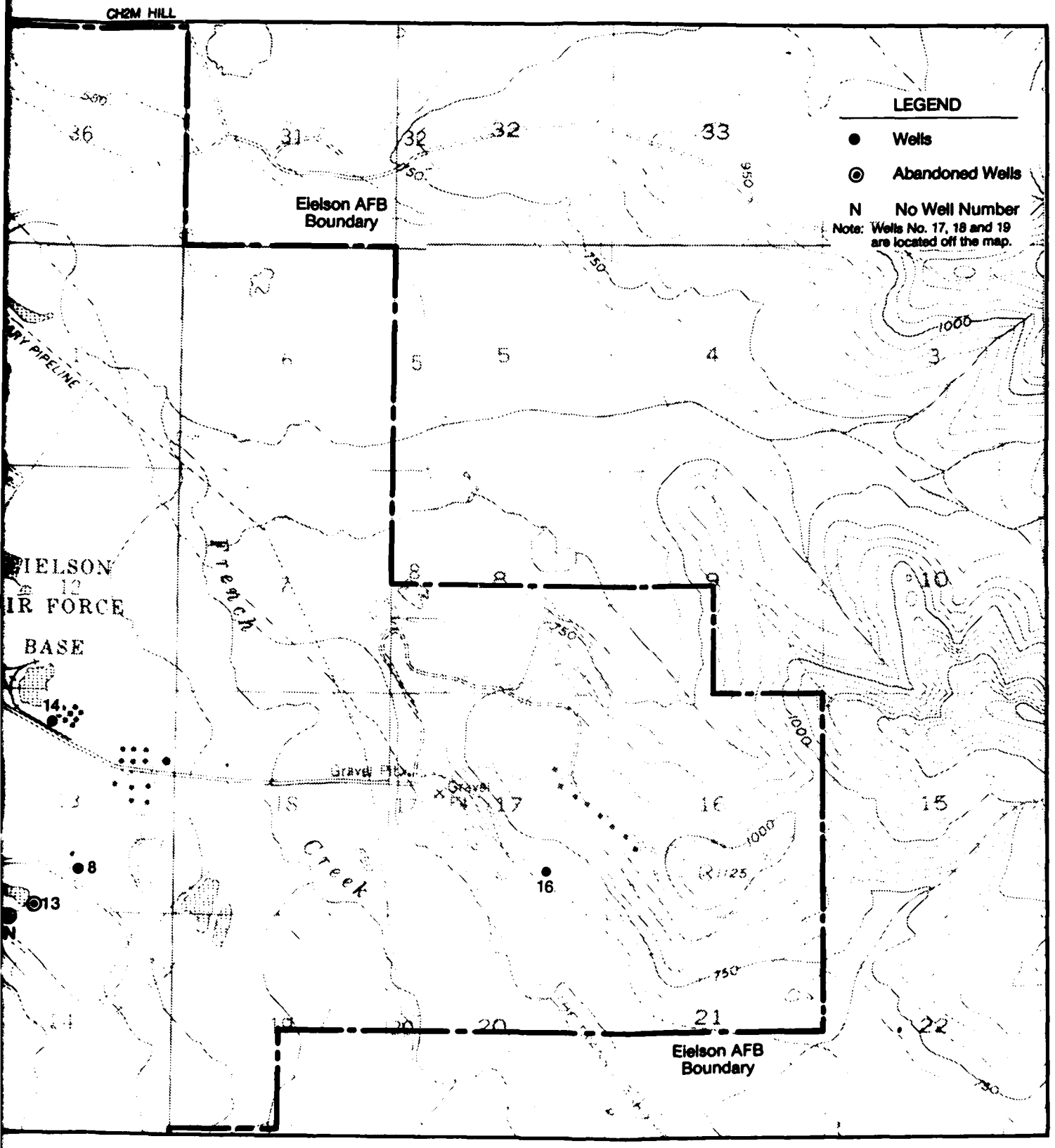
Table 4
CONSTRUCTION DETAILS OF WATER WELLS AT EIELSON AFB

Well No.	Location	Depth (feet)	Casing Size (inches)	Flow (gpm)	Remarks
A	Building No. 3408	96	12	1,000	Main system
B	Building No. 3430	96	12	1,000	Main system
C	Building No. 1201	96	12	1,000	Main system, emergency only
D	Building No. 6204	96	18	2,000	Main system
1	Building No. 4355	96	8	80-250	Pumps removed--line cut, abandoned
2	N223,800-E388,200	96	8	80-250	Pumps removed--line cut and plugged
3	N223,900-E388,600	96	8	80-250	Pumps removed--line cut and plugged
4	N227,300-E387,900	96	8	80-250	Abandoned
5	Building No. 1225	96	4	80-250	Pump removed
5A	Building No. 1164	96	8	490	Main system, automatic emergency only
7	Building No. 1301	96	12	1,000	Fire pump not connected to main
7A	Building No. 1301	96	6	150	Secondary main system
8	Building No. 1307	90	4	10	
9	M226,000-E388,400				Abandoned
11	N226,600-E389,300				Abandoned
12	Building No. 2318	96	8	150	Sewage treatment plant
13	Building No. 1317	90	4	6-2/3	Abandoned
14	Building No. 6224	96	4	6-2/3	
15	Building No. 1216	90	4	6-2/3	Weather site, abandoned
16	Building No. 6395	150	4	6-2/3	Ski lodge
17	Building No. 500	96	8	85	Transmitter site, abandoned
18	Building No. 6151	250	6	150	Engineer Hill
19	Building No. 2030	140	4	8	Birch Lake
20	Building No. 3351	90	6	120	
21	Building No. 6200	112	20	3,000	Water supply-power plant
22	Building No. 6201	118	20	3,000	Water supply-power plant

Source: Master Plan, Water Supply System, Eielson Air Force Base, updated September 30, 1981.



Location of water well



ion of water wells at Eielson AFB.

FIGURE 10.

constant recharge source allow for a relatively rapid ground-water movement adjacent to recharge areas, providing an adequate thermal source to prevent permafrost formation.

The vertical permeability of the aquifer is relatively high, estimated to be 1.0×10^{-1} cm/sec. The absence of extensive silt or clay beds allows percolation of water and/or contaminant into the aquifer to occur very rapidly. In addition, the low clay and/or silt content of the sediments overlying the water table results in low adsorption. Upon reaching the water table, denser material would continue to migrate downward to the base of the aquifer. Less dense fluid would spread and mix with the ground water and move downgradient to a point of discharge.

D. ENVIRONMENTALLY SENSITIVE CONDITIONS

1. Habitat

The natural ecosystem found at Eielson AFB is characterized as lowland spruce/hardwood forest. These forests range from dense to open stands of evergreen and deciduous trees. The primary evergreen species are black spruce (Picea mariana), which is normally found in lowlands with poor drainage, and white spruce (P. glauca), which is found on knolls with better drainage. Deciduous trees common in this area include Alaskan paper birch (Betula papyrifera var. humilis), quaking aspen (Populus tremuloides), and black cottonwood (P. trichocarpa). Understory shrubs include several willow and alder species, dwarf birch, low bush cranberry, and blueberry. Small bogs and muskegs are found in depressions. In addition to these natural systems, there are some small man-made lakes on-base. These lakes are primarily old quarries which were dug below the water table and have since filled with water. Vegetation around the periphery of these lakes and bogs

include birch, willow, and alder shrubs and trees, plus sedges and bog cranberry. The banks of Garrison Slough (the surface drainage canal through the base proper) also support some riparian and aquatic vegetation. However, these banks are predominantly covered by grass and are maintained by mowing.

The major natural aquatic features in this vicinity are the Tanana River, French Creek, Moose Creek, and Piledriver Slough. Both French Creek, along the eastern edge of Eielson AFB, and Piledriver Slough along the western side of Eielson AFB discharge into Moose Creek just above its confluence with the Tanana River. All of these systems flow primarily toward the northwest.

Piledriver Slough is a unique system in that, with the construction of Richardson Highway, this slough was cut off from its normal water source--the Tanana River. Clear spring water has replaced the normal glacial till, and this slough is now able to support fish such as the important recreational species, the Arctic grayling (Thymallus arcticus), which is also found in French Creek. Fingerling silver salmon (Oncorhyncus kisutch) are stocked annually in Moose Lake (behind base housing) and in 28 Mile Pit (approximately 7 miles south of the main base off Richardson Highway) by the Alaska Department of Fish and Game. This stocking program provides a recreational fishery, primarily for Air Force families. However, some public fishing also occurs in these lakes.

Wildlife species which occur around Eielson AFB include moose (Alces alces), black bear (Ursus americanus), and beaver (Castor canadensis). Lakes and bogs provide feeding, resting, and nesting habitat for waterfowl.

2. Threatened and Endangered Species

There are three wildlife species listed as endangered by the U.S. Fish and Wildlife Service (U.S.F.W.S.) which occur in Alaska (excluding marine mammals). The State of Alaska lists two additional species. These sensitive species are shown in Table 5. Of these, only the peregrine falcon is likely to occur in the study area. The closest known population of peregrine falcon is approximately 5 miles southeast of Eielson AFB in the Salcha Bluff area. Currently, there are no inland species in Alaska listed as threatened by U.S.F.W.S. or by the State of Alaska. It should be noted that species such as the bald eagle, gray wolf, and grizzly bear do not have endangered/threatened status in Alaska.

3. Environmental Stress

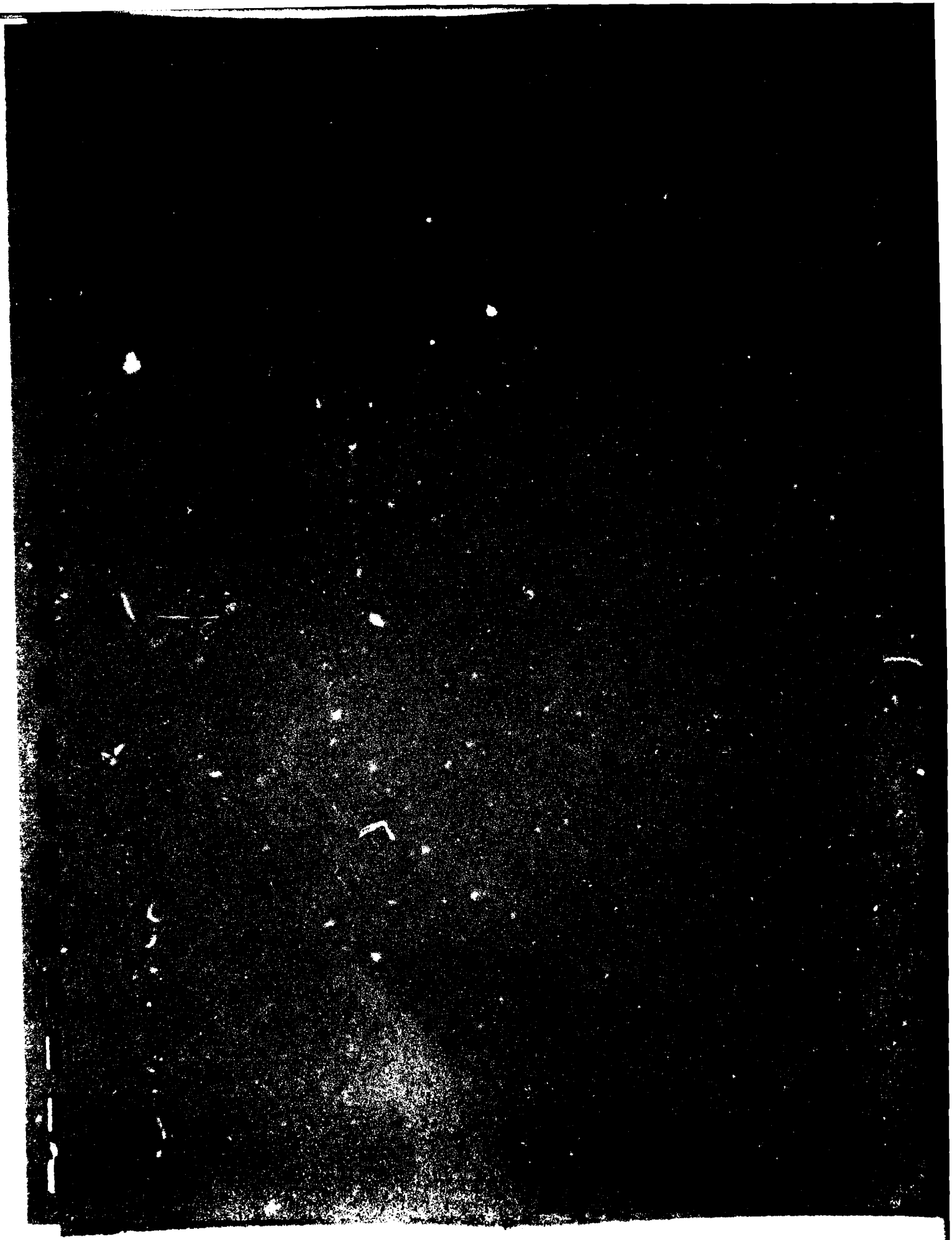
During a cursory ground survey of the developed portion of the base, there was only one area which appeared to be slightly environmentally stressed, i.e., the bank of POL Lake (Site No. 10) adjacent to the tank farm. This area was devoid of aquatic and riparian vegetation, while the remaining banks and lake edge supported both habitats. Other areas which showed stress were east of the major developed areas. These were sites 15 and 19 where major fuel spills occurred. Although dead trees and shrubs were observed at both of these sites, there was some evidence of regrowth of the herbaceous layers of vegetation.

Table 5
WILDLIFE SPECIES IN ALASKA DESIGNATED ENDANGERED BY
U.S. FISH AND WILDLIFE SERVICE AND THE STATE OF ALASKA

Common Name	Scientific Name	Status[a]
Arctic peregrine falcon	Falco peregrinus tundrius	AE
Peregrine falcon	Falco peregrinus	FE, AE
Aleutian Canada goose	Branta canadensis leucopareia	FE, AE
Eskimo curlew	Numenius burealis	FE, AE
Short-tailed albatross	Diomedea albatrus	AE

[a]FE = Federal Endangered--A species in danger of extinction throughout all or a significant portion of its range.

AE = Alaska Endangered--see "Federal Endangered" for definition.



IV. FINDINGS

A. ACTIVITY REVIEW

1. Summary of Industrial Waste Disposal Practices

The majority of industrial operations at Eielson AFB have been in existence since the early 1950s. The initial construction of the installation began in approximately 1943, and the original base was completed in 1944. The majority of the current base facilities were constructed during a major construction program during the period from 1947 to 1954. The base was used jointly by the U.S. Army and the USAF during the 1950s. The industrial operations and related wastes were insignificant prior to 1950. The major industrial operations include propulsion shops, pneudraulics shops, aerospace ground equipment (AGE) maintenance shops, non-destructive inspection (NDI) labs, and vehicle maintenance shops. These industrial operations generate varying quantities of waste oils, fuels, solvents, and cleaners.

The total quantity of waste oils, fuels, solvents, and cleaners generated ranges from 25,000 to 40,000 gallons per year. Due to a mission change in 1981, 18 A-10 aircraft have been assigned to Eielson AFB, and some aircraft maintenance activities have been increased. The above range of total waste quantities is believed to be representative for the period from the early 1950s to present.

Standard procedures for past (based on the best recollection of interviewees) and present industrial waste disposal practices at Eielson AFB are as follows:

- 1950 to 1972: Industrial wastes included waste oils, fuels, solvents, and cleaners. The final

disposition of the majority of waste oils was road oiling, fire department training exercises, and landfill. Waste oils were transported in drums and bowsers to a central asphalt mixing area where they were mixed with other waste fuels and sprayed on the dirt roads for dust control. Prior to 1955, most of the base roads were unpaved, and road oiling was extensive. Throughout this period waste oils were also transported to the fire department training area. and burned during training exercises. Waste oils were also transported to one of the main base landfills for disposal. Some waste oils were discharged into the sanitary sewer system. During the latter part of this period some waste oils were transported to Ft. Wainwright for salvage or to be burned in the power plant located there.

The final disposition of contaminated fuels was road oiling, fire department training exercises, and disposal in the waste POL pit. Only contaminated fuels which could not be reused or downgraded and then reused were disposed of. Contaminated fuels, primarily diesel fuel, were transported to a central asphalt mixing area where they were mixed with waste oils and used for road oiling and were also burned at the fire department training area during training exercises. Some contaminated fuels and fuel tank sludge were placed in a waste POL pit during this time. Like the waste oils, some contaminated fuels were also transported to Ft. Wainwright for salvage during the latter part of this period (1950 to 1972).

The final disposition of spent industrial solvents and cleaners was road oiling, fire department training exercises, landfill, and discharge to the sanitary sewer. Since no program of waste separation existed, most spent solvents were commingled with waste oils and disposed of in the same manner as the waste oils, as previously described. Some spent solvents and most aircraft cleaning compounds were washed down the shop and hangar floor drains which discharge, without pretreatment, to the sanitary sewer system. The domestic wastewater received primary treatment at the base sewage treatment plant during this time period.

- 1972 to 1978: Industrial wastes included waste oils, fuels, solvents, and cleaners. Waste oils were used for road oiling, transported to a base landfill for disposal, or turned over to DPDO located at Ft. Wainwright for salvage. The burning of waste oils during fire department training exercises was halted in approximately 1972.

  Contaminated JP-4 fuel with less than 10 percent contamination was mixed with clean JP-4 fuel and burned during fire department training exercises. Most other contaminated fuels which could not be reused or downgraded and then reused were turned over to DPDO for salvage. Some contaminated fuels, primarily diesel fuels, were used for road oiling. The disposal of contaminated fuels and fuel tank sludge in the waste POL pit was halted in 1970.

  The majority of spent industrial solvents were commingled with waste oils and disposed of in

the same manner as the waste oils, which includes road oiling, landfill disposal, and salvage through DPDO. Some solvents and most aircraft cleaning compounds were discharged to the sanitary sewer system. Secondary treatment facilities at the base sewage treatment plant went into operation in 1972.

- 1978 to Present: Industrial wastes include waste oils, fuels, solvents, and cleaners. The final disposition of waste oils is road oiling or salvage through DPDO. A permitted maximum of 5,000 gallons of waste oils and fuels is used for road oiling. The remaining waste oils are segregated, placed in marked 55-gallon drums, and transported to DPDO for salvage.

  Contaminated JP-4 fuel with less than 10 percent contamination is mixed with clean JP-4 fuel and burned during fire department training exercises. Waste diesel fuel is used for road oiling (included in the 5,000 gallons mentioned above). All other contaminated fuels which cannot be reused or downgraded and then reused are segregated, placed in marked 55-gallon drums, and transported to DPDO for salvage.

  Spent industrial solvents are segregated, placed in marked 55-gallon drums, and transported to DPDO to await proper disposal. Aircraft cleaning compounds are discharged to the sanitary sewer system. All wastewater originating from the base receives secondary treatment at the base sewage treatment plant.

2. Industrial Operations

The industrial operations at Eielson AFB are primarily involved in the routine maintenance O-2, KC-135, and A-10 aircraft. Appendix E contains a master list of the industrial operations.

A review of base records and interviews with past and present base employees resulted in the identification of the industrial operations where the majority of industrial chemicals are handled and hazardous wastes are generated. Table 6 summarizes the major industrial operations and includes the estimated quantities of wastes generated as well as the past and present disposal practices of these wastes, i.e., treatment, storage, and disposal. Those industrial operations which are listed in Appendix E but are not discussed in this section are considered to be minor. Information on estimated waste quantities and past disposal practices is based upon information obtained from shop files and interviews with shop personnel based upon their best recollection. Descriptions of the major industrial activities are included in the following paragraphs.

a. 343rd and 6th Consolidated Aircraft Maintenance Squadron

i) Jet Engine Propulsion Shop

The Jet Engine Propulsion Shop is located in Facility No. 1124. Maintenance activities conducted in this shop include the overhaul and testing of jet engines. Wastes generated during maintenance activities include PD 680 (420 gal/yr) and commingled engine oil and JP-4 (300 gal/yr). PD 680 is a petroleum distillate used as a safety cleaning solvent. PD 680 Type II is currently used

Table 6
MAJOR INDUSTRIAL OPERATIONS SUMMARY

Shop Name	Location (Fac. No.)	Waste Material	Estimated Waste Quantity	Treatment/Storage/Disposal Methods 1950 1960 1970 1980
343rd and 6th Consolidated Aircraft Maintenance Squadron				
Jet Engine Propulsion Shop	1124	PD 680	420 gal/yr	DPDO, SS, RO, LF RO, FT, SS, LF → DPDO
		JP-4 / Engine oil commingled	300 gal/yr	DPDO, RO, LF RO, FT, LF → DPDO, RO
Aircraft Generation Branch	1226, 1232, 1300	Aircraft cleaning compound	300 gal/yr	Oil/water separator to SS SS
		Hydraulic fluid Waste oils	100 gal/yr varies	DPDO, RO, LF RO, FT, LF → DPDO, RO
		JP-4 AVGAS	varies varies	FT, RO, WPP → DPDO, FT, RO
AGE Maintenance Shop	1152	Turbine engine oil Transmission fluid Arctic engine lube oil Hydraulic fluid	60 gal/yr 24 gal/yr 600 gal/yr 270 gal/yr	DPDO, RO, LF RO, FT, LF → DPDO, RO
		Aircraft cleaning compound	1,200 gal/yr	Oil/water separator to SS SS
		PD 680	450 gal/yr	DPDO, SS, RO, LF RO, FT, SS, LF → DPDO

LEGEND:

FT = Fire training
RO = Road oiling
LF = Landfill
SS = Sanitary sewer
WPP = Waste POL pit
DPDO = Defense Property Disposal Office (includes former redistribution and marketing facility)

Table 6--Continued

Shop Name	Location (Fac. No.)	Waste Material	Estimated Waste Quantity	Treatment/Storage/Disposal Methods 1950 1960 1970 1980
NDI Lab	1141	Penetrant	25 gal/yr	SS
		Emulsifier	25 gal/yr	
		Developer	40 gal/yr	
		X-Ray developer	40 gal/yr	
		Waste oil commingled 1, 1, 1-trichloroethane	12 gal/yr	DPDO, RO, LF RO, FT. LF DPDO, RO
		X-Ray fixer	40 gal/yr	Silver recovery at base photo lab
Munitions Maintenance Shop	6122 6159	Brake fluid	30 gal/yr	DPDO, RO, LF RO, FT, LF DPDO, RO
		PD 680	200 gal/yr	DPDO, SS, RO, LF RO, FT, SS, LF DPDO
Corrosion Control Shop	1141	Waste paint and paint remover	60 gal/yr	DPDO, SS, RO, LF RO, FT, SS, LF DPDO
		Lacquer thinner	10 gal/yr	
		Methyl ethyl ketone (MEK)	110 gal/yr	
Pneudraulics Shop	1141	Hydraulic fluid	90 gal/yr	DPDO, RO, LF RO, FT, LF DPDO, RO
		PD 680	275 gal/yr	DPDO, SS, RO, LF RO, FT, SS, LF DPDO

LEGEND:

FT = Fire training
RO = Road oiling
LF = Landfill
SS = Sanitary sewer
WPP = Waste POL pit
DPDO = Defense Property Disposal Office (includes former redistribution and marketing facility)

Table 6--Continued

Shop Name	Location (Fac. No.)	Waste Material	Estimated Waste Quantity	Treatment/Storage/Disposal Methods 1950 1960 1970 1980
AGE Dispatch	1125 1127 1128	Lube oil	380 gal/yr	DPDO, RO, LF RO, FT, LF → DPDO, RO
		Aircraft Cleaning Compound	100 gal/yr	SS →
Repair and Reclamation Shop	1140	PD 680	360 gal/yr	DPDO, SS, RO, LF RO, FT, SS, LF → DPDO
Electric/Battery Shop	1141	Battery electrolyte (potassium hydroxide) Battery acid (sulfuric acid)	1 gal/yr 500 gal/yr	Neutralization to SS →
		PD 680	100 gal/yr	DPDO, SS, RO, LF RO, FT, SS, LF → DPDO
SAC AGE Support	1135 1136	Hydraulic fluid Engine oil	1,200 gal/yr 300 gal/yr	DPDO, RO, LF RO, FT, LF → DPDO, RO
		PD 680	60 gal/yr	DPDO, SS, RO, LF RO, FT, SS, LF → DPDO
		Aircraft cleaning compound Antifreeze	100 gal/yr 210 gal/yr	SS →
343rd Transportation Squadron				
General Vehicle Maintenance	3213	Antifreeze PD 680 Radiator cleaning compound	1,320 gal/yr 100 gal/yr 5 gal/yr	DPDO, SS, RO, LF RO, FT, SS, LF → DPDO

LEGEND:

FT = Fire training
RO = Road oiling
LF = Landfill
SS = Sanitary sewer
WPP = Waste POL pit
DPDO = Defense Property Disposal Office (includes former redistribution and marketing facility)

Table 6--Continued

Shop Name	Location (Fac. No.)	Waste Material	Estimated Waste Quantity	Treatment/Storage/Disposal Methods
General Vehicle Maintenance--Cont.		Synthetic lube oil	600 gal/yr	RO, FT, LF → DPDO, RO
		MOGAS	60 gal/yr	FT, RO, WPP → DPDO, FT, RO
Heavy/Special Equipment Maintenance	2171	Engine oil Hydraulic oil Gear lube oil	3,440 gal/yr 1,750 gal/yr 1,100 gal/yr	RO, FT, LF → DPDO, RO
		PD 680 Antifreeze Lacquer thinner	1,200 gal/yr 660 gal/yr 10 gal/yr	RO, FT, SS, LF → DPDO
		Aircraft cleaning compound	1,200 gal/yr	SS → Oil/water separator to SS
Battery Shop	2171	Battery acid (sulfuric acid)	750 gal/yr	Neutralization to SS
Motor Pool	2351	Engine oil Arctic engine oil Transmission fluid	190 gal/yr 190 gal/yr 30 gal/yr	RO, FT, LF → DPDO, RO
		Antifreeze	325 gal/yr	RO, FT, SS, LF → DPDO
		Aircraft cleaning compound	660 gal/yr	SS → Oil/water separator to SS

LEGEND:

FT = Fire training
RO = Road oiling
LF = Landfill
SS = Sanitary sewer
WPP = Waste POL pit
DPDO = Defense Property Disposal Office (includes former redistribution and marketing facility)

Table 6--Continued

Shop Name	Location (Fac. No.)	Waste Material	Estimated Waste Quantity	Treatment/Storage/Disposal Methods
Refueling Maintenance	2351	Lube oil	100 gal/yr	DPDO, RO, LF; RO, FT, LF; DPDO, RO
		Arctic engine lube oil	50 gal/yr	
		Transmission fluid	50 gal/yr	
		Antifreeze	50 gal/yr	DPDO, SS, RO, LF; RO, FT, SS, LF; DPDO
		PD 680	10 gal/yr	
		Aircraft cleaning compound	120 gal/yr	Oil/water separator to SS; SS
343rd Civil Engineering Squadron				
Paint Shop	6214	Lacquer thinner	60 gal/yr	DPDO, SS, RO, LF; RO, FT, SS, LF; DPDO
		MEK	120 gal/yr	
Metals Processing Shop	2350	Engine oil	24 gal/yr	DPDO, RO, LF; RO, FT, LF; DPDO, RO
		Lube oil	6 gal/yr	
		PD 680	1,000 gal/yr	DPDO, SS, RO, LF; RO, FT, SS, LF; DPDO
Central Heating and Power Plant	6230	Waste acid	10,000 gal/5 yrs	Neutralization to SS
		Battery acid (sulfuric acid)	36 gal/yr	
		Waste oils	600 gal/yr	DPDO, RO, LF; RO, FT, LF; DPDO, RO

1950 1960 1970 1980

LEGEND:

FT = Fire training
RO = Road oiling
LF = Landfill
SS = Sanitary sewer
WPP = Waste POL pit
DPDO = Defense Property Disposal Office (includes former redistribution and marketing facility)

Table 6--Continued

Shop Name	Location (Fac. No.)	Waste Material	Estimated Waste Quantity	Treatment/Storage/Disposal Methods 1950 1960 1970 1980
Independent Electric (Power Production)	2175	PD 680	265 gal/yr	RO, FT, SS, LF → DPDO, SS, RO, LF → DPDO
		Antifreeze	315 gal/yr	
		Engine oil	1,850 gal/yr	RO, FT, LF → DODO, RO, LF → DPDO, RO
		Aircraft cleaning compound	50 gal/yr	SS
		Battery acid (sulfuric acid)	120 gal/yr	Neutralization to SS

LEGEND:

FT = Fire training
RO = Road oiling
LF = Landfill
SS = Sanitary sewer
WPP = Waste POL pit
DPDO = Defense Property Disposal Office (includes former redistribution and marketing facility)

in the industrial operations at Eielson AFB; however, PD 680 Types I and II were commonly used in the past. The primary difference between PD 680 Type I and Type II is the flash point of the material. The flash points are 100°F and 140°F for PD 680 Types I and II, respectively.

ii) Aircraft Generation Branch

The Aircraft Generation Branch is located in Facilities No. 1226, 1232, and 1300. The Aircraft Generation Branch performs preflight maintenance activities and is comprised of eight different sections, which include the Phase, Support, A-10, O-2, Alert, Weapons, Egress, and Propulsion sections. Wastes generated include aircraft cleaning compound (300 gal/yr), hydraulic fluid (100 gal/yr), waste oils, and contaminated JP-4 and AVGAS. The quantity of wastes oils and contaminated fuels will vary depending on the need for and level of maintenance. The aircraft cleaning compound used during maintenance activities at Eielson AFB is an alkaline, organic cleaning solution and is highly diluted before being discharged to an oil/water separator.

iii) AGE Maintenance Shop

The AGE Maintenance Shop is located in Facility No. 1152. The responsibility of this shop is to repair, maintain, and periodically inspect all aerospace ground equipment. Wastes generated include turbine engine oil (60 gal/yr), transmission fluid (24 gal/yr), arctic engine lube oil (600 gal/yr), hydraulic fluid (270 gal/yr), aircraft cleaning compound (1,200 gal/yr), and PD 680 (450 gal/yr).

iv) NDI Lab

The NDI Lab is located in Facility No. 1141. Non-destructive testing methods, including x-ray, magnaflux, and ultrasound are performed to determine material defects of aircraft structures and component parts. Wastes generated include penetrant (25 gal/yr), emulsifier (25 gal/yr), developer (40 gal/yr), x-ray developer (40 gal/yr), x-ray fixer (40 gal/yr), and commingled waste oil and 1, 1, 1-trichloroethane (12 gal/yr).

v) Munitions Maintenance Shop

The Munitions Maintenance Shop is located in Facilities No. 6122 and 6159. Wastes generated during the cleaning and repair of munitions systems include brake fluid (30 gal/yr) and PD 680 (200 gal/yr).

vi) Corrosion Control Shop

The Corrosion Control Shop is located in Facility No. 1141. Corrosion control activities include cleaning, sanding, wiping, priming, repainting, and stenciling of aircraft. Wastes generated include waste paint and paint remover (60 gal/yr), lacquer thinner (10 gal/yr), and MEK (110 gal/yr).

vii) Pneudraulics Shop

The Pneudraulics Shop is located in Facility No. 1141. The primary purpose of this shop is to service and repair all aircraft pneumatic and hydraulic equipment. Wastes generated include hydraulic fluid (90 gal/yr) and PD 680 (275 gal/yr).

viii) AGE Dispatch

The AGE Dispatch is located in Facilities No. 1125, 1127, and 1128. Wastes generated during the maintenance, servicing, and dispatching of aerospace ground equipment include lube oil (380 gal/yr) and aircraft cleaning compound (100 gal/yr).

ix) Repair and Reclamation Shop

The Repair and Reclamation Shop is located in Facility No. 1140. Industrial activities conducted in this shop include sheet metal fabrication and repair. The only waste generated is PD 680 (360 gal/yr).

x) Electric and Battery Shop

The Electric and Battery Shop is located in Facility No. 1141. Wastes generated from the servicing of both lead and nickel-cadmium batteries include battery electrolyte (potassium hydroxide, 1 gal/yr), battery acid (sulfuric acid, 500 gal/yr), and PD 680 (100 gal/yr). The battery electrolyte is neutralized with boric acid and the battery acid is neutralized with baking soda. After these wastes are neutralized, they are discharged to a holding and separator tank which is connected to the sanitary sewer. Until June 1982, the used battery casings had been brought to the base landfill for disposal. Used battery casings are now turned over to DPDO for salvage.

xi) SAC AGE Support

The SAC AGE Support is located in Facilities No. 1135 and 1136. Wastes generated during the repair, maintenance, and inspection of aerospace ground

equipment include hydraulic fluid (1,200 gal/yr), engine oil (300 gal/yr), PD 680 (60 gal/yr), aircraft cleaning compound (100 gal/yr), and antifreeze (210 gal/yr).

b) 343rd Transportation Squadron

i) General Vehicle Maintenance Shop

The General Vehicle Maintenance Shop is located in Facility No. 3213. Wastes generated during the repair and maintenance of light duty vehicles include antifreeze (1,320 gal/yr), PD 680 (100 gal/yr), radiator cleaning compound (5 gal/yr), synthetic lube oil (600 gal/yr), and MOGAS (60 gal/yr). A vehicle washrack is located outside on the southeast side of Facility No. 3213 and is used on a daily basis during the summer. The washwater from the washrack drains into an oil/water separator which is connected to the sanitary sewer.

ii) Heavy/Special Equipment Maintenance Shop

The Heavy/Special Equipment Maintenance Shop is located in Facility No. 2171. Wastes generated during the repair and maintenance of heavy and special purpose equipment and vehicles include engine oil (3,440 gal/yr), hydraulic oil (1,750 gal/yr), gear lube oil (1,100 gal/yr), PD 680 (1,200 gal/yr), antifreeze (660 gal/yr), lacquer thinner (10 gal/yr), and aircraft cleaning compound (1,200 gal/yr).

iii) Battery Shop

The Battery Shop is located in Facility No. 2171. The only waste generated during the servicing of lead batteries is battery acid (sulfuric acid, 750 gal/yr). The battery acid is neutralized with baking

soda and discharged to the sanitary sewer. Approximately 500 used battery casings are turned over to DPDO for salvage each year.

iv) Motor Pool

The Motor Pool is located in Facility No. 2351. Wastes generated during the maintenance of motor pool vehicles include engine oil (190 gal/yr), arctic engine oil (190 gal/yr), transmission fluid (30 gal/yr), antifreeze (325 gal/yr), and aircraft cleaning compound (660 gal/yr). The facility also houses one of the only vehicle washracks which can be used during the winter. The washrack washwater is discharged to an oil/water separator which is connected to the sanitary sewer.

v) Refueling Maintenance Shop

The Refueling Maintenance Shop is located in Facility No. 2351. Wastes generated during the repair and maintenance of aircraft refueling trucks include lube oil (100 gal/yr), arctic engine lube oil (50 gal/yr), transmission fluid (50 gal/yr), antifreeze (50 gal/yr), PD 680 (10 gal/yr), and aircraft cleaning compound (120 gal/yr).

c) 343rd Civil Engineering Squadron

i) Paint Shop

The Paint Shop is located in Facility No. 6214. Wastes generated include lacquer thinner (60 gal/yr) and MEK (120 gal/yr).

ii) Metals Processing Shop

The Metals Processing Shop is located in Facility No. 2350. Industrial activities conducted in this shop include welding and sheet metal repair and fabrication. Wastes generated include engine oil (24 gal/yr), lube oil (6 gal/yr), and PD 680 (1,000 gal/yr).

iii) Central Heating and Power Plant

The Central Heating and Power Plant is located in Facility No. 6230. Wastes generated during routine maintenance operations include battery acid (sulfuric acid, 36 gal/yr) and waste oils (600 gal/yr). The battery acid is neutralized with baking soda and discharged to the sanitary sewer. In addition to the routine maintenance, the boilers are acid treated approximately once every 5 years, which generates large quantities of waste acid (10,000 gal). The waste acid is neutralized before being discharged to the sanitary sewer. The Power Plant discharges "sump" water, which consists primarily of air scrubber water to the Power Plant Sludge Pit (Site No. 40) to allow settleable matter to settle out. The Power Plant also utilizes a recirculating cooling pond to cool the condensed boiler water. During summer operation the return water temperature becomes too high, making it necessary to intermittently discharge some cooling pond water and add make-up water from a well. This discharge is accomplished at a rate of 1,500 gpm and the duration of the discharge is dependent on the water temperature. The cooling pond water is discharged to a ditch which enters French Creek. Herbicides are added to the cooling pond to control aquatic growth. Numerous other chemicals are used at the Power Plant for treatment of the feed water, but no wastes are generated.

iv) Independent Electric Shop (Power Production)

The Independent Electric Shop is located in Facility No. 2175. This shop installs, operates, maintains, repairs, and inspects electrical power production equipment. Wastes generated include PD 680 (265 gal/yr), antifreeze (315 gal/yr), engine oil (1,850 gal/yr), aircraft cleaning compound (50 gal/yr), and battery acid (sulfuric acid 120 gal/yr).

3. Fuels

The four major fuel storage areas on Eielson AFB are the E-2, E-6, E-10, and E-11 fuel tank farms. These four tank farms together house 21 aboveground, diked POL storage tanks. The E-2 storage area contains six 16,000-barrel tanks for JP-4 storage. The E-6 storage area contains six 30,000-barrel tanks and one 100,000-barrel tank for JP-4 storage and two 5,000-barrel tanks for JP-7 storage. The E-10 storage area contains one 10,000-barrel tank for JP-4 storage. The E-11 storage area contains five 55,000-barrel tanks for JP-4 storage. There are numerous other tanks on-base for the storage of diesel fuel, MOGAS, AVGAS, heating fuel oil, and de-icing liquids. A complete inventory of the major (greater than 1,000-gallon capacity) POL storage tanks, including location, type of POL storage, capacity, and the type of tank, is included in Appendix F.

Due to the large storage capacity and the long-standing refueling and defueling mission at Eielson AFB, there has been a significant potential for fuel spills. Eleven major fuel spill sites and fuel-saturated areas (Sites No. 10 through 20) have been identified by the records search. All the known major fuel spills have been identified in the report. Although numerous other minor

fuel spills have occurred in the past, these are relatively insignificant. Three fuel-saturated areas (Sites No. 11, 18, and 20) have been identified where a hydrocarbon layer was found floating on the water table. The hydrocarbon layer was encountered during the drilling of test holes or during construction between 1972 to 1979. The fuel spill sites and fuel-saturated areas are described in detail later in the report (see Section IV-B-3, page IV-42).

The major POL storage tanks are cleaned every 3 to 6 years. The quantities of sludge generated per tank during a cleaning operation are small, and the sludge consists mainly of water, rust, dirt, and fuel. Prior to 1970, the sludge was either transported to the waste POL pit (Site No. 38) for disposal or weathered and buried at the fuel storage areas. Between 1970 and 1980, all sludge was weathered and buried at the fuel storage areas. Since 1980, any sludge generated during cleaning operations has been drummed and turned over to DPDO. Sludge weathering and burial has occurred at the E-6, E-10, and E-11 fuel storage areas. Since these storage tanks have been in operation since 1955, the potential that these tanks have stored leaded AVGAS at one time does exist. The E-2 storage area has several tanks storing AVGAS; however, it was reported that no sludge weathering activities have been conducted at this site. Leak testing is conducted annually at the major POL storage tanks.

Four abandoned storage tanks have been identified at Eielson AFB. These include two 5,000-gallon underground MOGAS storage tanks located to the south of Facility No. 2351 and two 5,000-gallon underground MOGAS storage tanks located to the south of Facility No. 2271. Interviewees reported that they suspect that other abandoned storage tanks of smaller capacity may be present at Eielson AFB.

4. Fire Department Training Exercises

Fire department training activities have been common since the activation of the base. Past and present fire department training activities at Eielson AFB are as follows:

- 1948 to 1955: During this time period, training exercises were conducted at the Original Fire Department Training Area (Site No. 8), which is located near the installation boundary in the northwest area of the base. Information about this site is limited. Exercises were conducted on a wrecked B-29 aircraft, which was placed in a empty gravel pit. Approximately 250 gallons of POL waste were used per exercise. The POL waste included commingled waste oils, contaminated fuels, and spent solvents. The frequency of exercises is assumed to be approximately once per week. Most of the POL waste would have been consumed in the fire, but some minor percolation into the ground may have taken place. This gravel pit has since filled in with water, because it was excavated near the water table and the regional elevation of the water table has increased over the last 25 years. The wrecked aircraft is still visible from the air.

- 1955 to 1976: During this period, training exercises were conducted at the Current Base Landfill (Site No. 3). This site was used solely as a fire department training area from 1955 to 1967 and has been used as the main base landfill since 1967. Therefore, both fire department training activities and landfill operations were conducted in the same area

between 1967 and 1976. Exercises were conducted a minimum of twice per month, but the frequency may have varied. POL wastes, including waste oils, contaminated fuels, and spent solvents, were burned during the exercises up to approximately 1972. Approximately 500 gallons of POL waste were used per exercise. After 1972, clean JP-4 fuel mixed with approximately 200 gallons of less than 10 percent contaminated JP-4 were used with the same frequency and in the same quantity during the exercises. The same procedure used at the previous site was followed, and some minor percolation into the ground may have occurred.

- 1976 to Present: Exercises are conducted at the Current Fire Department Training Area (Site No. 9). Current procedures are to presaturate the ground with approximately 5,000 gallons of water, apply the starter fuel, preburn for 30 seconds, and then put the fire out with 6 percent aqueous film-forming foam. Exercises are conducted a minimum of twice per month, but the frequency may vary. Approximately 500 to 1,000 gallons of clean JP-4 mixed with up to water, apply the starter fuel, preburn for 30 seconds, and then put the fire out with 6 percent aqueous film-forming foam. Exercises are conducted a minimum of twice per month, but the frequency may vary. Approximately 500 to 1,000 gallons of clean JP-4 mixed with up to 200 gallons of less than 10 percent contaminated JP-4 is poured onto and around a simulated aircraft for each exercise. Most of the fuel is consumed in the fire, but some minor percolation into the ground may take place.

5. Polychlorinated Biphenyls (PCBs)

Polychlorinated biphenyls (PCBs) are among the most chemically and thermally stable organic compounds known to man. Because of their stability, PCBs, once introduced into the environment, persist for long periods of time and are not readily biodegradable. The current established PCBs criteria are as follows:

PCBs Concentration (ppm)	Classification
Less than 50	Non-regulated
Between 50 and 500	PCBs-contaminated
Greater than 500	PCBs

Possible sources of PCBs at Eielson AFB are electrical transformers and capacitors. There are 723 in-service transformers and capacitors at Eielson AFB. No in-service transformers or capacitors have been tested for PCBs but are assumed to be PCBs-contaminated.

There are two PCBs storage areas on-base, located in Facilities 2339 and 3424 (Sites No. 30 and 31, respectively). All PCBs materials are located within diked areas inside buildings. These facilities currently house all out-of-service transformers and capacitors from Eielson AFB, out-of-service transformers and capacitors from Clear AFS, and PCBs-contaminated soil and liquid from the cleanup of a PCBs spill at Pedro Dome. The total quantity of PCBs-contaminated liquid in storage at these facilities is approximately 14,500 gallons. An inventory lists seven empty transformer casings, 59 undrained transformers, 1,064 capacitors, 82 55-gallon drums of PCBs-contaminated soil, and 23 55-gallon drums of PCBs-contaminated liquid.

There is no record or report of any major PCBs spills from leaking or blown transformers or during the handling of any PCBs materials. One interviewee reported that some minor spills of less than 5 gallons have occurred during maintenance operations in the past.

6. Pesticides

Pesticides are commonly used at Eielson AFB. The Entomology Shop controls the use and handling of all pesticides used to control mosquitoes, cockroaches, ants, and mice, as well as undesirable weeds, algae, and overgrowth.

The major pesticides currently used are Baygon (5 lb/mo), D-Tox-4E (1 lb/mo), Diazinon (1 lb/mo), Dursban (1 lb/mo), Malathion (1 lb/summer), Pyrethrins (3 lb/mo), and Resmethrin (2 lb/mo). The major herbicides currently used are 2,4-D Ester (100 lb/summer), HYVAR X (100 lb/summer), and Diquat (100 lb/summer). Proper preparation and application procedures are followed.

There were no reports of banned or restricted pesticides or herbicides currently used on-base. DDT was used extensively in the past up to approximately 1966. It was reported that approximately 40 to 50 drums of DDT were used per year. Some aerial spraying of DDT was conducted. It was also reported that when the use of DDT was banned, 200 drums of stored DDT were turned over to DPDO. The records search did not indicate any apparent contamination problems from past pesticide usage.

7. Wastewater Treatment

The sanitary and industrial wastewater from Eielson AFB is treated at the base sewage treatment plant. The plant was built in 1953 and initially provided primary

treatment by means of three primary clarifiers and two sludge digesters. The plant was expanded in 1973 to provide secondary treatment. The plant expansion included two aeration lagoons and chlorination facilities. The average daily flow is approximately 900,000 gpd. The industrial wastewater contribution is estimated to be approximately 5 percent of the total average daily flow. Some industrial wastewater receives pretreatment, by oil/water separators located in the industrial shop areas, for the removal of floating oils and greases.

The effluent from the plant was discharged to Garrison Slough prior to 1979. The treated effluent discharge to Garrison Slough was permitted by the National Pollution Discharge Elimination System (NPDES) Permit No. AK-002089-3. As required by the NPDES permit, the treated effluent was routinely monitored for total flow, biochemical oxygen demand, suspended solids, pH, chlorine residual, settleable solids, and fecal coliform bacteria. The treated effluent was also monitored for chemical oxygen demand (COD) and oil and grease. Since September 1979, the treated effluent has been diverted to an infiltration pond (Site No. 23), which was an old rock quarry at one time. Diverting the treated effluent to the infiltration pond removed the NPDES monitoring requirements. The treated effluent is still routinely monitored for the above parameters. It was reported that the unauthorized dumping of POL products into the sanitary sewer system has been a continual problem in the past. This is reflected by above-normal levels of COD and oil and grease periodically detected in the treated effluent.

Digested sludge is dewatered on sludge drying beds (Site No. 34), then periodically removed and transported to the base landfill for disposal. There are two areas at the plant which have been used for sludge

drying operations. The first area used eight drying beds (constructed for that purpose) from 1953 to 1973. At the second area, which has been in use since 1973, the digested sludge is discharged to a natural depression located between the digesters and the aeration lagoons. Neither of these areas has a leachate collection system. There are also two spill ponds (Site No. 32) located at the plant. These ponds, constructed in approximately 1970, have been used to divert spills of POL products and other chemicals to prevent a plant upset. Both the spill ponds and the sludge drying beds will be discussed in further detail in Section IV-B-5 (see page IV-55).

There are 12 oil/water separators located at various industrial shops and washracks to provide pretreatment of the industrial wastewater. An inventory of all oil/water separators, including facility number and method of effluent discharge, is provided in Appendix G. Information on the date of construction of these facilities was not available, but they are believed to have been in operation since the late 1960s. The slop oil removed by the oil/water separators is periodically pumped out and disposed of as waste POL.

8. Available Water Quality Data

The majority of the potable water for Eielson AFB is obtained from four main wells located on base property. The main water supply system consists of Wells No. A, B, C, and D (Facilities No. 3408, 3430, 1201, and 6204, respectively). Well No. 5A is also part of the main system and is for emergency use only. The ground water from these wells is treated at the base water treatment plant. The base water treatment plant, constructed in 1953, provides aeration, lime coagulation, clarification, sand filtration, fluoridation, and chlorination for a flow of

approximately 1.0 mgd. The water quality characteristics of a selected well at Eielson AFB are shown in Table 3, page III-12. The wells are analyzed annually for heavy metals, pesticides, nitrate, and fluoride. The most recent test results show that no heavy metals or pesticides are present in the well supplies. The wells have not been analyzed for volatile organic compounds. In addition to the wells comprising the main water supply system, there are two wells at the power plant for feed water supply, seven other operating wells (mostly in remote areas of the base), and nine abandoned wells. The locations of all wells are shown on Figure 10.

The storm drainage system at Eielson AFB is composed primarily of culverts, ditches, and creeks. The four water courses on Eielson AFB are Moose Creek, French Creek, Piledriver Slough, and Garrison Slough. Garrison Slough provides the main drainage for the majority of the main base proper. Ten water quality sampling points were monitored quarterly by Bioenvironmental Engineering personnel through 1979. Currently four water quality sampling points are being monitored, including French Creek at Quarry Road, Garrison Slough at the Sewage Treatment Plant, Garrison Slough at Transmitter Road, and Moose Creek at Transmitter Road. The locations of both past and present sampling points are shown on Figure 11. Samples are ordinarily collected quarterly; however, no samples are collected when the creeks are frozen. The water quality samples are analyzed for fecal coliform, dissolved oxygen, pH, turbidity, temperature, total dissolved solids, and oil and grease. In general, turbidity is the only parameter in which the standard (5 Jackson Turbidity Units) is exceeded. There are no known sources of turbidity existing on-base.

The Power Plant discharges cooling pond water to a ditch which enters French Creek. The discharge of the cooling pond water is conducted only during the summer when

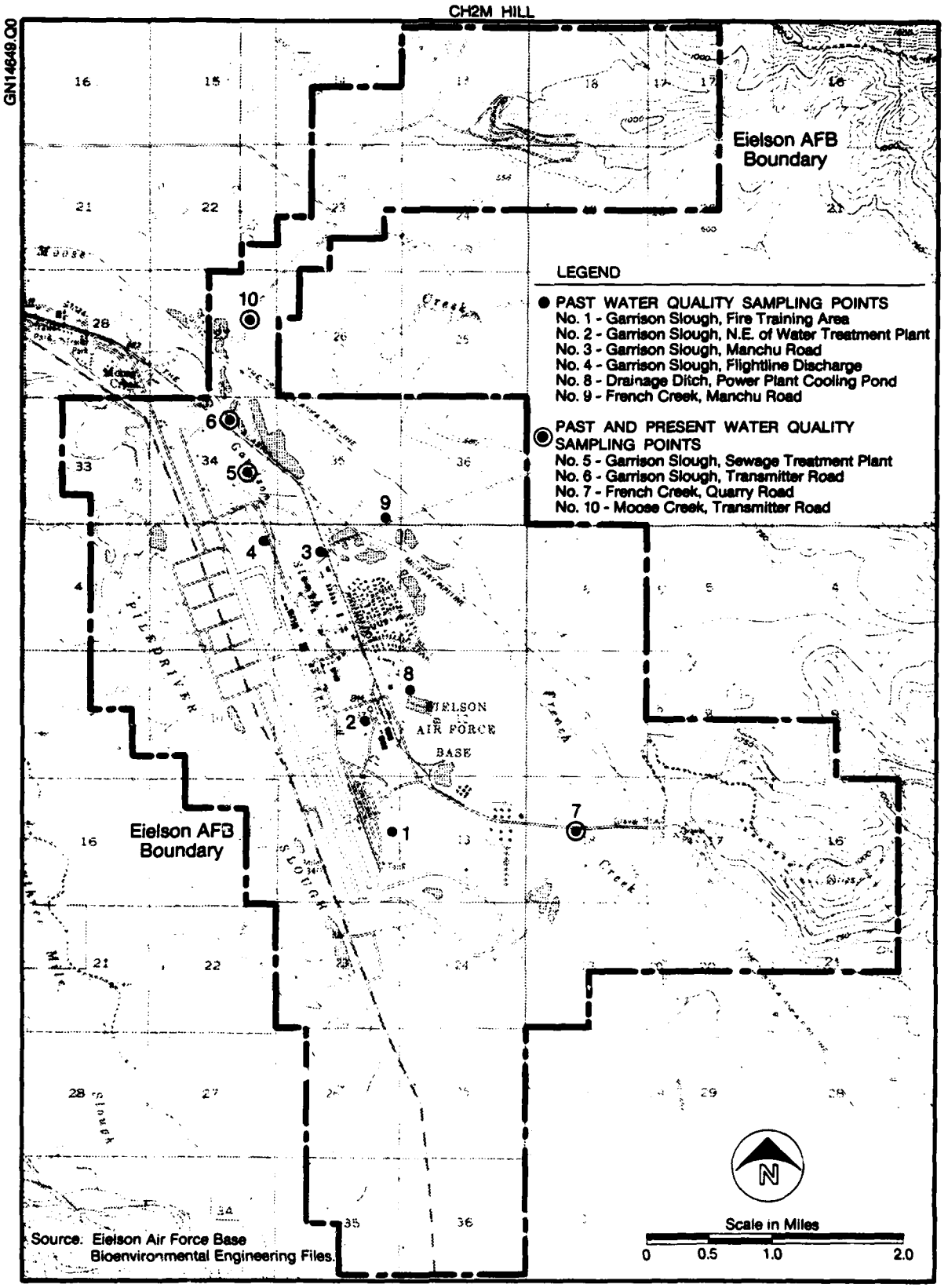


FIGURE 11. Location map of water quality sampling points.

the return water temperature becomes too high, as discussed in further detail in Section IV-A-1, page IV-17. The Power Plant cooling pond discharge is permitted under NPDES Permit No. AK-000134-1. The cooling pond discharge is monitored daily for flow and temperature as required by the permit. In addition, the cooling pond discharge is analyzed monthly for pH, Diquat, and copper sulfate. Available test results indicated that the levels of Diquat and copper sulfate were below the compliance standards of 1.0 mg/l and 0.5 mg/l, respectively. The cooling pond discharge has also been analyzed for heavy metals, and test results showed that none were present.

The base sewage treatment plant discharges filter backwash water and lime sludge to a pond area of Garrison Slough adjacent to the plant. This discharge was conducted under an NPDES permit until Garrison Slough was dammed below the discharge point and the permit was cancelled. The water quality sampling point (Point No. 2), which monitored this pond area until 1979, showed turbidity as the only parameter exceeding the standard.

9. Other Activities

The review of the records and information obtained during the interviews produced no evidence of the past or present storage, disposal, or handling of biological or chemical warfare agents at Eielson AFB. There were also no indications of any large-scale use of trichloroethylene at Eielson AFB.

All explosive ordnance disposal (EOD) activities are conducted at the EOD area (Site No. 4). This site has been in operation since the 1960s and is the only known EOD area on Eielson AFB. Primarily small munitions and starter cartridges are burned at this facility. The detonation and

burning operations are conducted approximately once every month. The munitions residue is then buried at the site. There is a 25-pound explosive limit, and any larger munitions are sent off-base for proper disposal.

Large quantities (estimated 25,000 to 50,000 gal/yr) of isopropyl alcohol are used during the winter months to control ice on the runways. The de-icing of aircraft is accomplished by using ethylene glycol, which was also used in large quantities in the past for ice control on the base streets. This practice was halted in the early 1970s due to potential harmful effects of ethylene glycol on children and pets. The de-icing fluids are still used for runways and aircraft.

All asbestos materials have been handled in accordance with the Occupational Safety and Health Administration (OSHA) requirements during building modification and rehabilitation. Asbestos building materials are currently disposed of at the Asbestos Site (Site No. 43). Prior to May 1982, asbestos building materials were disposed of at the base landfills.

B. DISPOSAL SITES IDENTIFICATION AND EVALUATION

Interviews with 27 past and present base personnel (Appendix C) resulted in the identification of 43 disposal and spill sites at Eielson AFB. The approximate locations of these sites are shown on Figure 12 (see page IV-67). A summary of the approximate dates that the major sites were in use is given on Figure 13.

A preliminary screening was performed on all 43 identified past disposal and spill sites based on the information obtained from the interviews and available records from the base and outside agencies. Using the decision tree process described in Section I.E., page I-4,

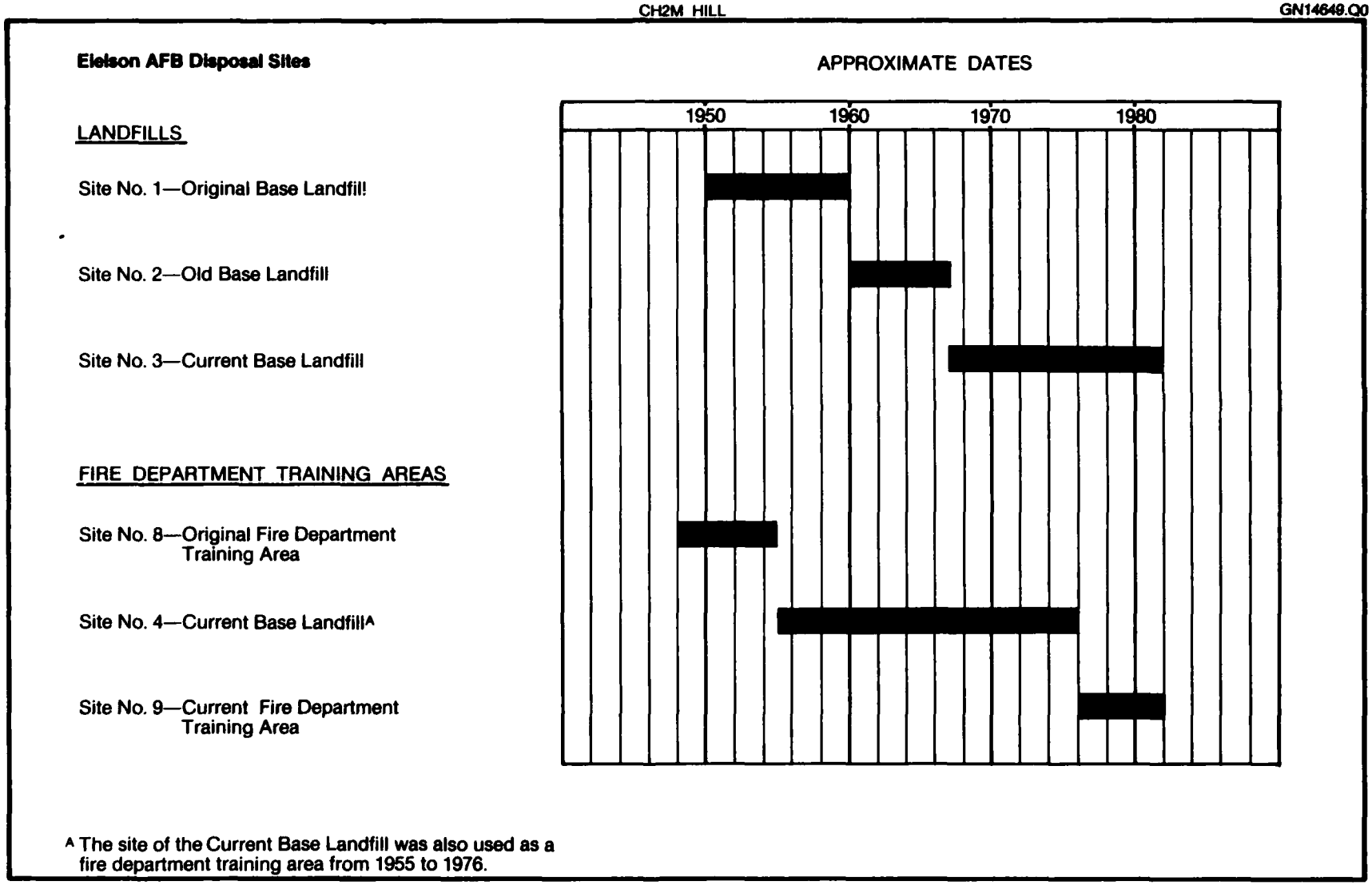


FIGURE 13. Historical summary of activities at major disposal sites at Eielson AFB.

based on all of the above information, a determination was made as to whether a potential exists for hazardous material contamination in any of the identified sites. For those sites where the potential for hazardous material contamination was identified, a determination was made as to whether a potential exists for contaminant migration from these sites. The sites where the potential for migration exists were then rated using the U.S. Air Force Hazard Assessment Rating Methodology (HARM), which was developed jointly by the Air Force, CH2M HILL, and Engineering-Science for specific application to the Air Force Installation Restoration Program. The HARM system considers four aspects of the hazard posed by a specific site: the waste and its characteristics, the potential pathways for waste contaminant migration, the receptors of the contamination, and any efforts to contain the contaminants. Each of these categories contains a number of rating factors that are used in the overall hazard rating. A more detailed description of the HARM system is included in Appendix H. Copies of the completed rating forms are included in Appendix I. A summary of the overall hazard ratings is given in Table 7.

The following is a description of each site, including a brief discussion of the rating results.

1. Landfills

Sanitary landfill sites at Eielson AFB from 1950 to present are discussed below:

- Site No. 1, Original Base Landfill (overall score 63), was the main base landfill for the entire base from approximately 1950 to 1960. Information pertinent to the landfill operations conducted at this site is limited. It was reported that no burning

Table 7
SUMMARY OF RESULTS OF SITE RATINGS

Site No.	Site Description	Subscore (% of Maximum Possible Score in Each Category) Receptors	Pathways	Waste Characteristics	Waste Management Practices Factor	Overall Score	Page Reference of Site Rating Form
1	Original Base Landfill (1950 to 1960)	49	69	70	1.0	63	I-1
2	Old Base Landfill (1960 to 1967)	51	69	70	1.0	63	I-3
3	Current Base Landfill (1967 to present)	50	69	100	1.0	73	I-5
4	Old Army Landfill and EOD Area (1956 to 1959; late 1960s to present)	41	60	40	1.0	47	I-7
5	Old Army Landfill (1956 to 1959)	46	60	40	1.0	49	I-9
6	Old Landfill (1959 to 1963)	52	60	40	1.0	51	I-11
8	Original Fire Department Training Area (1948 to 1955)	55	87	40	1.0	61	I-13
9	Current Fire Department Training Area (1976 to present)	52	60	80	1.0	64	I-15
10	POL Lake and E-2 POL Storage Area	58	80	80	1.0	73	I-17
11	Fuel-Saturated Area	58	100	64	0.95	70	I-19
13	E-4-1/2 Diesel Fuel Spill Area	56	60	64	1.0	60	I-21
14	E-2, Railroad JP-4 Fuel Spill Area	52	60	40	1.0	51	I-23
15	Multiproduct Fuel Line	52	80	64	1.0	65	I-25
16	MOGAS Fuel Line Spill	52	60	56	1.0	56	I-27
17	Conol Pipeline Spill	56	60	56	1.0	57	I-29
18	Fuel-Saturated Area, Old Boiler Plant	52	80	56	1.0	63	I-31
19	JP-4 Fuel Line Spill	56	80	64	1.0	67	I-33
20	Refueling Loop Fuel-Saturated Area	48	80	56	1.0	61	I-35
21	Road Oiling--Quarry Road	56	60	40	1.0	52	I-37
22	Road Oiling--Industrial Drive	57	60	40	1.0	52	I-39
23	Road Oiling--Manchu Road	54	60	40	1.0	51	I-41
24	Road Oiling--Gravel Haul Road	58	60	40	1.0	53	I-43
25	E-6 Fuel Tank Sludge Burial Site	56	60	38	1.0	51	I-45
26	E-10 Fuel Tank Sludge Burial Site	52	60	38	1.0	50	I-47
27	E-11 Fuel Tank Sludge Burial Site	56	60	38	1.0	51	I-49
29	Drum Burial Site	52	69	40	1.0	54	I-51
32	Sewage Treatment Plant Spill Ponds	54	60	80	1.0	65	I-53
34	Sewage Treatment Plant Sludge Drying Beds	54	60	30	1.0	48	I-55

Table 7--Continued

Site No.	Site Description	Subscore (% of Maximum Possible Score in Each Category) Receptors	Pathways	Waste Characteristics	Waste Management Practices Factor	Overall Score	Page Reference of Site Rating Form
35	Asphalt Mixing Area, Asphalt Drum Disposal (early 1950s to late 1960s)	58	60	48	1.0	55	I-57
36	Drum Storage Site and Asphalt Mixing Area (late 1960s to mid-1970s)	52	80	48	1.0	60	I-59
37	Drum Storage Site and Asphalt Mixing Area (mid-1970s to present)	52	80	48	1.0	60	I-61
38	Waste POL Pit	52	60	64	0.95	56	I-63
39	Asphalt Lake	44	80	64	1.0	63	I-65
41	Auto Hobby Shop	52	80	48	1.0	60	I-67
42	Miscellaneous Storage and Disposal Area	52	60	40	1.0	51	I-69

was conducted at this site, only burial of base refuse. The site received all refuse from the base, which included household garbage, scrap lumber, scrap metal, construction debris, and empty cans and 55-gallon drums from the flightline industrial shops. It was reported that this site also received waste oils, spent solvents, and paint residues and thinners. During a ground tour of this site, numerous old and rusty empty 55-gallon drums were observed. Also, other empty containers and scrap metal which have worked their way to the surface were observed. The overall rating score for this site (63) is due mainly to the waste characteristics subscore (70) since suspected large quantities of spent solvents and waste thinners may have been disposed of at this site over a 10-year period. The receptors subscore (49) is due mainly to the use of the ground water as a drinking supply. The pathways subscore (69) is due mainly to the depth to the ground water (less than 10 feet) and the permeable soil conditions.

- Site No. 2, Old Base Landfill (overall score 63), was the main base landfill for the entire base from approximately 1960 to 1967. The base refuse was first burned and then buried at this site. Burning of refuse was halted in approximately 1964. After landfilling operations ceased in 1967, a cover of fly ash from the Central Heating and Power Plant was placed on this site. A ground tour of this site

indicated that the fly ash cover was still in good condition. The site received all refuse from the base, which included household garbage, scrap lumber, scrap metal, construction debris, and empty cans and drums from the flightline industrial shops. It was reported that this site also received waste oils, spent solvents, and paint residues and thinners. The overall rating score for this site (63) is due mainly to the waste characteristics subscore (70) since suspected large quantities of spent solvents and waste thinners may have been disposed of at this site over a 7-year period. The receptors subscore (51) is due mainly to the use of the ground water as a drinking water supply. The pathways subscore (69) is due mainly to the depth to the ground water (less than 10 feet) and the permeable soil conditions.

- Site No. 3, Current Base Landfill (overall score 73), has been used as the main base landfill from 1967 to present and was used as a major fire department training area from 1955 to 1976. Therefore, this site has been in use for approximately 27 years. The Fire Department Training Area was located adjacent to an old gravel pit located in the southwestern portion of the landfill as it exists today. Interviewees reported that POL wastes, including waste oils, contaminated fuels, and spent solvents, were transported to the fire training pit. The POL wastes were then burned during exercises, which

were conducted a minimum of twice per month. Approximately 500 gallons of POL waste were used per exercise. In approximately 1972, the practice of burning POL wastes during the exercises was halted. From 1972 to 1976, clean JP-4 fuel mixed with approximately 200 gallons of less than 10 percent contaminated JP-4 was used during the exercises. Most of the POL waste would have been consumed in the fire, but some minor percolation into the ground may have taken place. Originally the landfill operations at this site consisted of placing all waste materials in an old gravel pit located on the site. Interviewees reported that the waste materials were dumped into standing water in the gravel pit since the pit was excavated below the water table. The refuse in the gravel pit was covered with fill on a daily basis. Once the gravel pit was filled to capacity, refuse was then placed in excavated trenches and covered on a daily basis. The trenching operation has continued, and the landfill has expanded in a northeasterly direction, encompassing approximately a 50-acre area. No burning of waste materials has been conducted at this site. Similar to the previous base landfills, this site has also received all base refuse, which includes household garbage, scrap lumber, scrap metal, construction debris, and empty cans and drums from the flightline industrial shops. It was reported that this site also received waste oils, spent solvents, and paint residues and thinners.

Interviewees also reported that approximately five to six drums of photographic chemicals from Detachment 460 were buried at this site during the late 1960s. Following reports that these buried chemicals might be radioactive, a radiation ground survey was conducted at the site where the drums were reportedly buried. No levels of radiation above background were detected. The overall rating for this site (73) is due mainly to the waste characteristics subscore (100) since large quantities of spent solvents, waste thinners, and waste oils have been disposed of at this site over a 27-year period. The receptors subscore (50) is due mainly to the close proximity to a nearby well (approximately 400 feet). The pathways subscore (69) is due mainly to the depth to the ground water (less than 10 feet) and the permeable soil conditions.

- Site No. 4, Old Army Landfill and Current EOD Area (overall score 47), was used as a landfill by the Army battery station located at the site from approximately 1956 to 1959 and has been used as the EOD Area since the late 1960s. Information pertaining to the landfill operations is limited. The landfill probably received general refuse including scrap materials and empty drums and containers. In addition, this landfill probably received small quantities of waste oils and spent solvents. EOD activities conducted at this site include denotation and

incineration of small munitions and starter cartridges and the burial of the munitions residue. During the burial of the munitions residue, excavations encountered buried drums, scrap metals, and general refuse, verifying the existence of the old landfill operation. The overall rating score for this site (47) is due mainly to the pathways subscore (60). The pathways subscore is due mainly to the depth to the ground water (less than 10 feet) and the permeable soil conditions. The receptors subscore (41) is due mainly to the use of the ground water as a drinking water supply. The waste characteristics subscore (40) is due to the suspected small quantities of spent solvents which may have been disposed of at this site.

- Site No. 5, Old Army Landfill (overall score 49), was used as a landfill by the Army battery station located at the site from approximately 1956 to 1959. Information pertaining to the landfill operations is limited. The landfill probably received small quantities of waste oils and spent solvents, in addition to general refuse such as scrap materials and empty drums and containers. The overall rating score for this site (49) is due mainly to the pathways subscore (60). The pathways subscore is due mainly to the depth to the ground water (less than 10 feet) and the permeable soil conditions. The receptors subscore (46) is due mainly to the use of the ground

water as a drinking water supply. The waste characteristics subscore (40) is due to the suspected small quantities of spent solvents which may have been disposed of at this site.

- Site No. 6, Old Landfill (overall score 51), was used as a secondary landfill from 1959 to 1963. It was reported that this site received general refuse and empty drums and paint containers from the flightline industrial shops. Since the majority of waste materials would have gone to Site No. 2 during this time period, only small quantities of waste paints and thinners and spent solvents as drum residuals are suspected at this site. The overall score for this site (51) is due mainly to the pathways subscore (60). The pathways subscore is due mainly to the depth to the ground water (less than 10 feet) and the permeable soil conditions. The receptors subscore (52) is due mainly to the distance to a nearby well (1,280 feet). The waste characteristics subscore (40) is due to the suspected small quantities of spent solvents which may have been disposed of at this site.

- Site No. 7, Test Landfill (not rated), was used as an experimental sanitary landfill for only a few months in approximately 1967. It was reported that this site received primarily household garbage, and the quantity of wastes received from the flightline industrial area, if any, is

judged to be very small. Since hazardous wastes are not present in sufficient quantity, there appears to be no potential for contamination and the site was not rated.

2. Fire Department Training Areas

- Site No. 8, Original Fire Department Training Area (overall score 61), was used for training exercises from 1948 to 1955. Exercises were conducted on a wrecked aircraft, which was placed in an old gravel pit, using approximately 250 gallons of POL waste per exercise. The frequency of exercises is assumed to be approximately once per week. The POL waste included commingled waste oils, contaminated fuels, and spent solvents. The majority of the POL waste would have been consumed in the fire, but some percolation into the ground may have taken place. The gravel pit is now filled with water, because it was excavated near the water table and the regional elevation of the water table has increased over the last 25 years. This would provide a relatively high driving force for contaminant migration. The overall rating score for this site (61) is due mainly to the pathways subscore (87). The pathways subscore is due mainly to the site being located below the mean ground-water level and the permeable soil conditions. The receptors subscore (55) is due mainly to the use of the ground water as a drinking water supply. The waste characteristics

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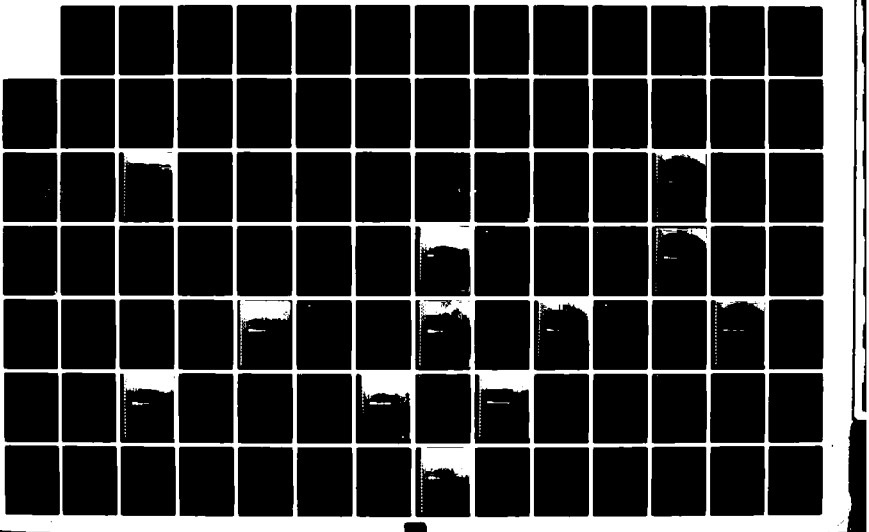

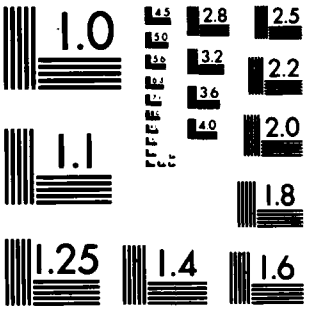

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subscore (40) is due to the suspected medium quantities of waste oils and contaminated fuels disposed of at this site.

Fire Department training exercises were conducted at the Current Base Landfill (Site No. 3) from 1955 to 1976. These activities have been described under Site No. 3.

- Site No. 9, Current Fire Department Training Area (overall score 64), has been in use for training exercises from 1976 to present. Current procedures are to presaturate the ground with approximately 5,000 gallons of water, apply the starter fuel, preburn for 30 seconds, and then extinguish the fire with 6 percent aqueous film-forming foam. Exercises are conducted a minimum of twice per month, but the frequency may vary. Approximately 500 to 1,000 gallons of clean JP-4 mixed with up to 200 gallons of less than 10 percent contaminated JP-4 is poured onto and around a simulated aircraft for each exercise. Most of the fuel is consumed in the fire, but some minor percolation into the ground may take place. The overall rating score for this site (64) is due mainly to the waste characteristics subscore (80) since large quantities of JP-4 fuel have been used in exercises at this site. The receptors subscore (52) is due mainly to the distance to a nearby well (240 feet) and the use of the ground water as a drinking water supply. The pathways subscore (60)

is due mainly to the depth to ground water (less than 10 feet) and the permeable conditions.

3. Fuel Spill Sites and Fuel-Saturated Areas

- Site No. 10, POL Lake and E-2 POL Storage Area (overall score 73), was the site of a MOGAS spill and is a suspected fuel-saturated area. Two MOGAS storage tanks at the E-2 POL storage area (Tanks No. 20 and 21) were detected to be leaking approximately 200 gallons per day. The leaking tanks were fixed in 1978. It was reported that numerous other spills have occurred within the diked area during refueling operations, including a spill in 1967 which filled the diked area to a depth of approximately 2 to 3 feet. The majority of the fuel was recovered during this spill. POL Lake is located approximately 200 feet downgradient from Tanks No. 20 and 21. An oil sheen (floating hydrocarbons) was observed on the water surface during a ground tour of the site which provides indirect evidence of contaminant migration. The floating hydrocarbon layer has appeared on POL Lake every spring and summer for at least the last 4 years. Absorbent booms were placed in the lake from 1979 to 1981 in an attempt to contain and clean up some of the floating hydrocarbons. The overall score for this site (73) is due mainly to the pathways subscore (80) since there is indirect evidence of contaminant migration. The receptors subscore (58) is

due mainly to the distance to a nearby well (240 feet). The waste characteristics subscore (80) is due to the large quantity of MOGAS which was spilled at this site.

- Site No. 11, Fuel-Saturated Area (overall score 70), is an area where a hydrocarbon layer is known to be floating on the water table. After an oily sheen was observed in Garrison Slough in 1975, an investigation to locate the source of this contamination was conducted. Shallow test holes were drilled near Facility 3224 and a hydrocarbon layer was discovered floating on top of the water table. Facility 3224 was the old bakery at one time and is presently the EOD office. Trenches were excavated below the water table in this area to initiate a clean-up action. The hydrocarbon layer was also observed in these trenches. An oil/water separator was installed to remove the floating hydrocarbons from the water collected in the trenches and from Garrison Slough. The oil/water separator remained in operation until 1980, at which time it was disconnected. Samples were collected and analyzed, and the primary constituent was identified to be a diesel fuel manufactured around 1950. There are several possible sources of the diesel fuel, including the old bakery, an old boiler house, and an unknown abandoned tank. The old bakery used furnaces which were fueled with diesel fuel. This seems to be a likely source since the test holes

drilled immediately around and downgradient to the old bakery encountered a hydrocarbon layer. An old boiler house located in this vicinity was also fueled with diesel fuel. The boiler house supplied heat to barracks and other buildings located in the nearby area. It was reported that the 4-inch line which used to supply the diesel fuel to the boiler house was dug up and removed in approximately 1977. This line had never been drained and still contained some diesel fuel. Although an underground abandoned tank has not been located or documented in this area, the possibility cannot be ruled out. The overall score for this site (70) is due mainly to the pathways subscore (100) since there was direct evidence of contaminant migration. The receptors subscore (58) is due mainly to the distance to a nearby well (400 feet). The waste characteristics subscore (64) is due to the large quantities of diesel fuel which have saturated this area. This site received a 0.95 waste management practices factor for the limited containment effort.

- Site No. 12, JP-4 Fuel Spill in Facility No. 2351 (not rated), was the site of a 5,000-gallon JP-4 spill which occurred in 1981. A malfunction of a a gate valve located on the rear of a refueling truck caused the accidental discharge. The spill occurred inside Facility 2351, and the majori y of the 5,000 gallons was contained within the building. It was

reported that approximately 100 gallons flowed outside of the building, most of which was collected by absorbent pads. Some of the fuel entered the utilidor system (an underground utility corridor), which was later pumped out and recovered. Although the potential for contamination existed, the potential for migration was insignificant and the site was not rated.

- Site No. 13, E-4-1/2 Diesel Fuel Spill Area (overall score 60), has been the site of numerous diesel spills. This site is located on the runway just south of the E-4 refueling and defueling area and storage tanks. Fuel bladders are filled with fuel, primary diesel and some MOGAS, and then transported by helicopter to remote training areas. Spills have occurred due to ruptured, leaking, and overfilled bladders. The fuel would migrate off the paved runway to the local ground surface. The overall score for this site (60) is due mainly to the waste characteristics subscore (64) since large quantities of diesel fuel has been spilled in this area. The receptors subscore (56) is due mainly to the distance to a nearby well (1,120 feet). The pathways subscore (60) is due mainly to the depth to the ground water (less than 10 feet) and the permeable soil conditions.

- Site No. 14, E-2 Railroad Fuel Spill Area (overall score 51), has been the location of numerous fuel spills during the delivery of fuels by railroad. Fuels were

delivered to the storage areas by railroad up to 1977. Numerous spills, primarily JP-4, occurred during the unloading and refueling operations. The overall score for this site (51) is due mainly to pathways subscore (60). The pathways subscore is due to the depth to the ground water (less than 10 feet) and the permeable soil conditions. The receptors subscore (52) is due mainly to the distance to a nearby well (100 feet). The waste characteristics subscore (40) is due to the suspected large quantities of JP-4 which may have been spilled at this site.

- Site No. 15, Multiproduct Fuel Line (overall score 65), has been the site of two major fuel spills which occurred in 1970 and 1973. The multiproduct fuel line runs along Quarry Road in the southeastern portion of the base. A 5,000-gallon MOGAS spill occurred in approximately 1970 and a 5,000-gallon JP-4 spill occurred in approximately 1973. It was reported that these spills were due to faulty welding on the line. Evidence of vegetative stress was observed during a ground tour of the site. The overall rating score for this site (65) is due mainly to the pathways subscore (80) since indirect evidence of contamination exists. The receptors subscore (52) is due mainly to the use of the ground water as a drinking water supply. The waste characteristics subscore (64) is due to the medium quantities of JP-4 and MOGAS which have been spilled in the area.

- Site No. 16, MOGAS Fuel Line Spill (overall score 56), was the site of a 5,000-gallon MOGAS spill in approximately 1957. This spill occurred near Facility 6214. The MOGAS fuel line runs from the E-2 POL Storage Area along Quarry Road, Industrial Drive, and Division Street to the base vehicle gas station. The overall score for this site (56) is due mainly to the pathways subscore (60). The pathways subscore is due mainly to the depth to ground water (less than 10 feet) and the permeable soil conditions. The receptors subscore (52) is due mainly to the distance to a nearby well (720 feet). The waste characteristics subscore (70) is due to the suspected large quantities of MOGAS which may have been spilled in this area.

- Site No. 17, Canol Pipeline Spill (overall score 57), was the site of a ruptured pipeline in 1957 which spilled approximately 20,000 gallons of diesel fuel onto and adjacent to Old Richardson Highway. The overall score for this site (57) is due mainly to the pathways subscore (60). The pathways subscore is due to the depth to the ground water (less than 10 feet) and the permeable soil conditions. The receptors subscore (56) is due mainly to the distance to a nearby well (2,240 feet). The waste characteristics subscore (56) is due to the suspected large quantities of diesel fuel which may have been spilled in this area.

- Site No. 18, Fuel-Saturated Area (overall score 63), Old Boiler Plant, is an area where a hydrocarbon layer was detected floating on the water table in the mid-1970s. During the construction of a structure to hold electrical outlets for electric car heaters, a series of 8-foot-deep holes were dug. The holes were dug below the water table and a hydrocarbon layer was found floating on the water. The source of this contamination was not identified; however, an old boiler house (Facility 3405) was located approximately 200 feet to the west. The old boiler house was fueled with diesel fuel. The overall score for this site (63) is due mainly to the pathways subscore (80) since there was indirect evidence of contaminant migration. The receptors subscore (52) is due mainly to the distance to a nearby well (80 feet). The waste characteristics subscore (56) is due to the suspected large quantities of fuel which may have been spilled in this area.

- Site No. 19, JP-4 Fuel Line Spill (overall score 67), was the site of a ruptured fuel line in the late 1950s. Interviewees reported that approximately 200,000 gallons of JP-4 was spilled during the rupture. Evidence of vegetative stress was observed during a ground tour of the site. The overall score for this site (67) is due mainly to the pathways subscore (80) since evidence of vegetative stress exists. The receptors subscore

(56) is due mainly to the distance to a nearby well (1,200 feet). The waste characteristics subscore (64) is due to the large quantity of JP-4 which was spilled at this site.

- Site No. 20, Refueling Loop Fuel-Saturated Area (overall score 61), is an area where a hydrocarbon layer was detected floating on the water table in 1972. The refueling loop is where the majority of the aircraft refueling operations are conducted, and numerous fuel spills have occurred in the past. The underground E-7, E-8, and E-9 POL storage areas are located on the refueling loop. In 1972, test holes were drilled, down to a depth of approximately 20 feet, at each of the three fuel pump stations (Facilities 1306, 1315, and 1321). A hydrocarbon layer was detected floating on the water table at each of the test holes. The overall score for this site (61) is due mainly to the pathways subscore (80) since there was indirect evidence of contaminant migration. The receptors subscore (48) is due mainly to the distance to a nearby well (100 feet from the closest test hole). The waste characteristics subscore (56) is due to the suspected large quantities of fuel which may have been spilled in this area.

- Sites No. 21, 22, 23, and 24 are the major roads where road oiling has been performed in the past for dust control (overall scores 52, 52, 51, and 53, respectively). Road oiling has been a common practice on

Eielson AFB since 1950 and is still conducted today. Prior to the construction of the majority of the base roads in 1955, road oiling was performed extensively throughout the base. The major roads where road oiling has been performed include Quarry Road (Site No. 21), Industrial Drive (Site No. 22), Manchu Road (Site No. 23), and Gravel Haul Road (Site No. 24). The State of Alaska Road Oiling Permit for Eielson AFB permits a maximum of 5,000 gallons and one application only. Prior to 1978, POL waste, including waste oils, contaminated fuels, and spent solvents, were used for road oiling. Since 1978, primarily waste engine oils and contaminated diesel fuel are used. Road oiling operations have been based at Sites No. 35, 36, and 37 where waste oils and contaminated fuels are mixed and placed in trucks. The POL waste is applied to approximately 3 to 5 miles of compacted dirt roads at a maximum application rate of 0.3 gallons per square yard. The surface application of the POL waste on the compacted road surfaces and the low net precipitation would have resulted in the majority of the volatile components, including fuels and solvents, being evaporated into the atmosphere. Some of the POL waste may also have percolated into the ground, where the biodegradable components would be degraded and assimilated by soil bacteria. The overall scores for these sites (52, 52, 51, and 53 for Sites No. 21, 22, 23, and 24, respectively) are

due mainly to the pathways subscores (60 for each site). The pathways subscore for each site is due mainly to the depth to the ground water (less than 10 feet) and the permeable soil conditions. The receptors subscores (56, 57, and 58 for Sites No. 21, 22, and 24, respectively) are due mainly to the distance to a nearby well (1,200, 2,640, and 1,600 feet for Sites No. 21, 22, and 24, respectively). The receptors subscore for Site No. 32 (54) is due mainly to the use of the ground water as a drinking water supply The waste characteristics subscores (4(for each site) are due to the suspectec small quantities of spent solvents and contaminated fuels which may have been applied to these roads.

4. Burial Sites Other Than Landfills

- Sites No. 25, 26, and 27 are the locations of the main POL storage areas where weathered sludge from periodic fuel tank cleaning operations was disposed of in the past (overall scores 51, 50, and 51, respectively). Sites No. 25, 26, and 27 are the E-6, E-10, and E-11 POL storage areas, respectively. The sludge, consisting mainly of water with some rust, dirt, and fuel, was drained periodically (about once every 3 to 6 years) from the bottom of the fuel storage tanks at a rate of approximately 200 gallons per tank cleaning operation. The sludge was then weathered and buried in shallow trenches. The majority of the residual fuel and

volatile components would have evaporated into the atmosphere during the weathering operation. Since these storage tanks have been in operation since 1955, the potential exists that these tanks have stored leaded AVGAS at some time and some lead residue may have been present in the sludge. The burial of fuel tank sludge at these sites was stopped in 1980 and now all sludge is drummed and turned over to DPDO. The overall scores for these sites (51, 50, and 51 for Sites No. 25, 26, and 27, respectively) are due mainly to the pathways subscore for each site (60). The pathways subscore is due mainly to depth to the ground water (less than 10 feet) and permeable soil conditions. The waste characteristics subscore for each site (38) is due to the suspected medium quantities of leaded sludge which may have been disposed of at these sites. The receptors subscores (56, 52, and 56 for Sites No. 25, 26, and 27, respectively) are due mainly to the distance to a nearby well (1,920, 1,120, and 2,320 feet for Sites No. 25, 26, and 27, respectively).

- Site No. 28, Fly Ash Disposal Site (not rated), was the disposal site for fly ash generated by the Central Heating and Power Plant from 1972 to 1977. This site was originally an old gravel pit which was filled in with fly ash. Analyses of the fly ash have shown that no hazardous constituents are present. Since no hazardous materials have been disposed of

at this site, there appears to be no potential for contamination and the site was not rated.

- Site No. 29, Drum Burial Site (overall score 54), was an old gravel pit used for the disposal of primarily empty 55-gallon drums from 1965 to 1968. An interviewee reported that approximately 400 to 500 empty drums were disposed of in the gravel pit. Prior to disposal, the drums contained asphalt emulsion, engine oils, and solvents. It was reported that some of the asphalt emulsion drums were full when disposed of. Some residual materials may have been present in the industrial solvents and engine oil drums. The drums were covered with fill material and the site is now used for the storage of asphalt road rubble. The overall score for this site (54) is due mainly to pathways subscore (69). The pathways subscore is due mainly to the depth to the ground water (less than 10 feet) and the permeable soil conditions. The receptors subscore (52) is due mainly to the distance to a nearby well (2,000 feet). The waste characteristics subscore (40) is due to the suspected small quantities of solvents which may have been disposed of at this site.

5. Other Sites

- Sites No. 30 and 31 are the two PCBs storage facilities at Eielson AFB (not rated). Site No. 30 is located in

Facility 2339 and Site No. 31 is located in Facility 3424. All PCBs materials are located within diked areas inside these buildings. These facilities currently house all out-of-service transformers and capacitors from Eielson AFB, out-of-service transformers and capacitors from Clear AFS, and PCBs-contaminated soil and liquid from the clean-up of a PCBs spill at Pedro Dome. The total quantity of PCBs- contaminated liquid in storage at these facilities is approximately 14,500 gallons. An inventory lists seven empty transformer casings, 59 undrained transformers, 1,064 capacitors, 82 55-gallon drums of PCBs-contaminated soil, and 23 55-gallon drums of PCBs-contaminated liquid. There have been no reports of any PCBs spills in these facilities. Therefore, there appears to be no potential for contaminant migration and this site was not rated.

- Site No. 32, Sewage Treatment Plant Spill Pond Area (overall score 65), has been in operation since 1970. The two spill ponds were originally constructed to provide additional contact time for the superchlorination of the primary treated effluent. The ponds were used for this purpose for only a short period of time and have been used intermittently as spill or diversion ponds for the last 10 years. After the addition of secondary treatment, the ponds were used to divert POL spills so as not to cause a plant upset. Either the operator is notified of the spill or

the spill is detected by an explosion meter installed on the influent line. The ponds have been used at least 10 times over the 10-year period for significant POL spills. An interviewee reported that a spill, which occurred in 1975 and was diverted to the ponds, did not involve the typical fuel or oil but an unknown industrial chemical or solvent. Once a spill is diverted to these unlined ponds it is allowed to percolate into soil. The overall score for this site (65) is due mainly to the waste characteristics subscore (80) since medium quantities of POL wastes have been disposed of at this site. The receptors subscore (54) is due mainly to the distance to a nearby well (400 feet). The pathways subscore (60) is due mainly to the depth to the ground water (less than 10 feet) and the permeable soil conditions.

- Site No. 33, Treated Effluent Infiltration Pond (not rated), has been in use since 1978. This pond was originally an old gravel pit which had been filled with water. The treated effluent is discharged to the pond year-round and percolates into the soil. Prior to 1978, the treated effluent was discharged to Garrison Slough and the Infiltration Pond was used intermittently during the summer. Since there is no indication of hazardous wastes present in the treated effluent, there appears to be no potential for contamination and this site was not rated.

- Site No. 34, Sewage Treatment Plant Sludge Drying Beds (overall score 48), consists of two separate areas used for dewatering the digested sludge. The original sludge drying beds were constructed with the rest of the sewage treatment plant in 1953 and were operated until 1973. The eight sludge drying beds did not have a leachate collection system. Since 1973, the digested sludge has been discharged to a natural depression located between the digesters and the aeration lagoons. This area also does not have a leachate collection system. It was reported that the sludge discharged to this depression has not been removed in the past 2 years. Information pertaining to the annual sludge production was not available. The dewatered sludge was periodically removed and hauled to the base landfill for disposal. Since the industrial wastewater accounts for approximately 5 percent of the total wastewater flow, the potential exists that the sludge and sludge leachate might contain some industrial contaminants such as metals. The overall score for this site (48) is due mainly to the pathways subscore (60). The pathways subscore is due mainly to the depth to the ground water (less than 10 feet) and the permeable soil conditions. The receptors subscore (54) is due mainly to the distance to a nearby well (320 feet). The waste characteristics subscore (30) is due to the suspected small quantities of hazardous constituents which may be present in the sludge.

- Site No. 35, Asphalt Mixing Area and Asphalt Drum Disposal (overall score 55), was used from the early 1950s to the late 1960s as a mixing area for asphalt and as the base for the road oiling operation. A mixing tank was used to mix tar and asphalt emulsion for road maintenance. Commingled waste oils and solvents were mixed with contaminated fuels at this site and then used for road oiling to control dust. It was reported during the interviews that approximately 200 empty asphalt drums were disposed of along the banks of Garrison Slough. There were also reports of asphalt-saturated areas at this site. A ground tour of the site showed no evidence of the empty drums or the asphalt-saturated areas. The drums were probably removed for proper disposal. The overall score for this site (55) is due mainly to the pathways subscore (60). The pathways subscore is due to the depth to the ground water (less than 10 feet) and the permeable soil conditions. The receptors subscore (58) is due mainly to the distance to a nearby well (640 feet). The waste characteristics subscore (48) is due to the medium quantities of waste oils and asphalt spilled at this site.

- Site No. 36, Drum Storage Site and Asphalt Mixing Area (overall score 60), was used from the late 1960s to the mid-1970s as a mixing area for asphalt and as the base for the road oiling operation. Evidence of a POL-saturated ground surface and a pool of water contaminated with POL was

observed adjacent to the mixing tank during a ground tour of this site. The mixing tank was used for mixing tar and asphalt emulsion for road maintenance, as well as waste oils and contaminated fuel for road oiling operations. In addition, approximately 100 drums are stored at this site. Approximately 30 to 50 percent of the drums are full. The drums have a variety of contents including waste oils, hydraulic fluid, diesel fuel, JP-4, PD-680, MEK, and other miscellaneous liquid wastes. It appears that some flightline industrial shops have brought their drummed waste products to this site. None of the drums were observed to be leaking. The overall score for this site (60) is due mainly to the pathways subscore (80) since there is indirect evidence of contamination. The receptors subscore (52) is due mainly to the distance to a nearby well (800 feet). The waste characteristics subscore (48) is due to the medium quantities of waste oils, fuel, and asphalt which have been spilled at this site.

- Site No. 37, Drum Storage Site and Asphalt Mixing Area (overall score 60), has been used from the mid-1970s to present as a mixing area for asphalt and as the base for the road oiling operation. The operations conducted at this site are very similar to those conducted at Site No. 36. Evidence of a POL-saturated ground surface and a pool of water contaminated with POL was observed adjacent to the mixing tank

during a ground tour of this site. In addition, approximately 50 drums of miscellaneous liquid wastes are stored at this site. Approximately 50 percent of these drums are full and their contents include waste oils, diesel fuel, JP-4, and PD-680. None of the drums were observed to be leaking. The overall score for this site (60) is due mainly to the pathways subscore (80) since there is indirect evidence of contamination. The receptors subscore (52) is due mainly to the distance to a nearby well (480 feet). The waste characteristics subscore (48) is due to the medium quantities of waste oils, fuels, and asphalt which have been spilled at this site.

- Site No. 38, Waste POL Pit (overall score 56), was used for the disposal of contaminated fuels and fuel tank sludge from the late 1950s until 1970. The Waste POL Pit was a 50-foot by 50-foot pit located adjacent to the E-1 POL storage area. The POL storage tanks have since been dismantled and removed. The waste material was removed from the pit and the site cleaned up in 1974. This pit primarily received only the contaminated fuels and fuel tank sludge from the E-1 POL storage area. The overall score for this site (56) is due mainly to the waste characteristics subscore (64) since large quantities of contaminated fuel have been disposed of at this site. The receptors subscore (52) is due mainly to the distance to a nearby well (1,600 feet).

The pathways subscore (60) is due mainly to the depth of the ground water (less than 10 feet) and the permeable soil conditions. This site received a 0.95 waste management practices factor for the limited containment effort.

- Site No. 39, Asphalt Lake (overall score 63), is the site of approximately 500 to 600 abandoned drums of asphalt emulsion. It was reported that the full drums of asphalt were left by a contractor after the construction of the runway was completed in the late 1940s. The drums have rusted over the years and leaked the majority of their contents. An area of approximately 1 acre is covered with asphalt emulsion to a depth of 6 to 12 inches. This asphalt has not hardened. Some of the drums remain partially full. The overall score for this site (63) is due mainly to the pathways subscore (80) since there is indirect evidence of contamination and evidence of vegetative stress. The receptors subscore (44) is due mainly to the use of the ground water as a water supply. The waste characteristics subscore (64) is due to the large quantities of asphalt emulsion disposed of at this site.

- Site No. 40, Power Plant Sludge Pit (not rated), was used from the late 1950s to the late 1970s. This site primarily received residue from the air scrubbers in the plant and periodically received small quantities of sludge generated during the

acid treatment and cleaning of boilers. The 1-acre site was cleaned out approximately every 2 years and the sludge hauled to the base landfill for disposal. Since there are insufficient quantities of any hazardous constituent present, there appears to be no potential for contamination and the site was not rated.

- Site No. 41, Auto Hobby Shop (overall score 60), was located in Facility 4298 and activities were conducted at this site until early 1982. The facility is used by base personnel for maintenance of their private vehicles. Four 55-gallon drums are located outside this facility for waste oil and contaminated fuel disposal. Small quantities of industrial solvents are also used at this location. During a ground tour of this site, the ground surface surrounding the waste oil drums was observed to be saturated with POL. This facility was in use over a long period of time and the careless handling of POL waste has resulted in many spills. The overall score for this site (60) is due mainly to the pathways subscore (80) since there is indirect evidence of contamination. The receptors subscore (52) is due mainly to the distance to a nearby well (1,040 feet). The waste characteristics subscore (60) is due to the medium quantity of waste oils and fuels spilled at this site.

- Site No. 4[illegible], Miscellaneous Storage and Disposal Area (overall score 51), was used

during the 1960s. It was reported that empty drums and containers were buried at this site. This site was also used for the storage of some miscellaneous construction materials and small equipment. The potential exists that some small quantities of POL waste, including solvents, may have been present in the drums as residue. The overall score for this site (51) is due mainly to the pathways subscore (60). The pathways subscore is due mainly to the depth to the ground water (less than 10 feet) and the permeable soil conditions. The receptors subscore (52) is due mainly to the distance to a nearby well (1,600 feet). The waste characteristics subscore (40) is due to the suspected small quantities of industrial solvents which may have been disposed of at this site.

- Site No. 43, Asbestos Site (not rated), is a permitted site for the disposal of construction rubble containing asbestos. The site has been in operation only since May 1982 and has been operated in accordance with existing regulations governing the disposal of asbestos. Since there are no hazardous materials present in sufficient quantity, there appears to be no potential for contamination and the site was not rated.

6. Summary

A total of 43 disposal and spill sites were identified at Eielson AFB. Of these, a total of 35 sites

were rated using the HARM rating system. These sites were identified as having a potential for hazardous material contamination and migration. A complete listing of all the sites, including potential hazards, is given in Table 8.

Table 8
DISPOSAL SITE RATING SUMMARY

Site No.	Site Description	Potential Hazard		Rated
		Contamination	Migration	
1	Original Base Landfill (1950 to 1960)	Yes	Yes	Yes
2	Old Base Landfill (1960 to 1967)	Yes	Yes	Yes
3	Current Base Landfill (1967 to present)	Yes	Yes	Yes
4	Old Army Landfill and EOD Area (1956 to 1959; late 1960s to present)	Yes	Yes	Yes
5	Old Army Landfill (1956 to 1959)	Yes	Yes	Yes
6	Old Landfill (1959 to 1963)	Yes	Yes	Yes
7	Test Landfill (1967)	No	NA	No
8	Original Fire Department Training Area (1948 to 1955)	Yes	Yes	Yes
9	Current Fire Department Training Area (1976 to present)	Yes	Yes	Yes
10	POL Lake and E-2 POL Storage Area	Yes	Yes	Yes
11	Fuel-Saturated Area	Yes	Yes	Yes
12	JP-4, Fuel Spill, Facility 2351	Yes	No	No
13	E-4-1/2 Diesel Fuel Spill Area	Yes	Yes	Yes
14	E-2, Railroad JP-4 Fuel Spill Area	Yes	Yes	Yes
15	Multiproduct Fuel Line	Yes	Yes	Yes
16	MOGAS Fuel Line Spill	Yes	Yes	Yes
17	Canol Pipeline Spill	Yes	Yes	Yes
18	Fuel-Saturated Area, Old Boiler Plant	Yes	Yes	Yes
19	JP-4 Fuel Line Spill	Yes	Yes	Yes
20	Refueling Loop Fuel-Saturated Area	Yes	Yes	Yes

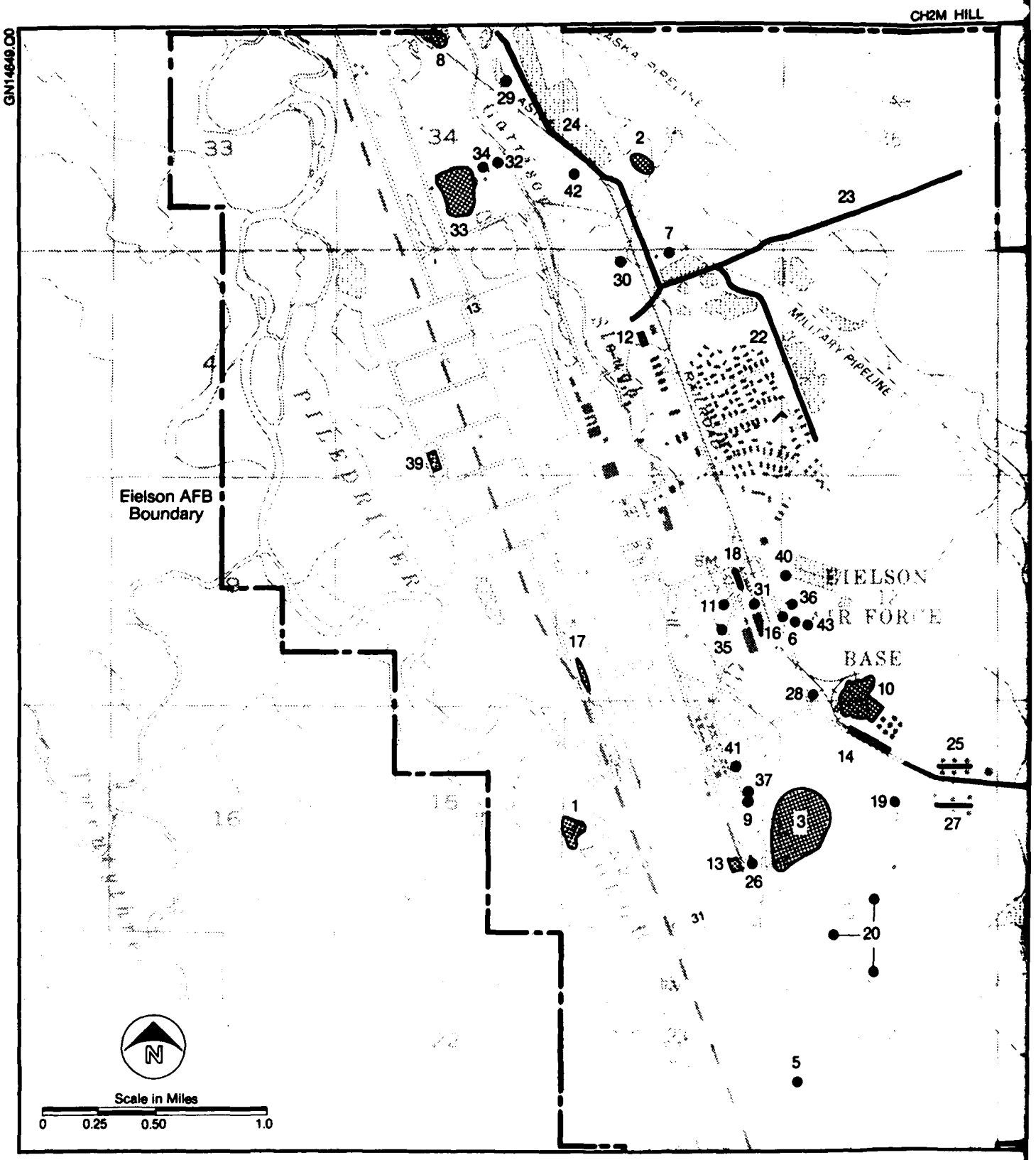
Table 8--Continued

Site No.	Site Description	Potential Hazard		Rated
		Contamination	Migration	
21	Road Oiling--Quarry Road	Yes	Yes	Yes
22	Road Oiling--Industrial Drive	Yes	Yes	Yes
23	Road Oiling--Manchu Road	Yes	Yes	Yes
24	Road Oiling--Gravel Haul Road	Yes	Yes	Yes
25	E-6 Fuel Tank Sludge Burial Site	Yes	Yes	Yes
26	E-10 Fuel Tank Sludge Burial Site	Yes	Yes	Yes
27	E-11 Fuel Tank Sludge Burial Site	No	Yes	Yes
28	Fly Ash Disposal Site	No	NA	No
29	Drum Burial Site	Yes	Yes	Yes
30	PCB Storage Area, Facility 2339	Yes	No	No
31	PCB Storage Area, Facility 3424	Yes	No	No
32	Sewage Treatment Plant Spill Ponds	Yes	Yes	Yes
33	Treated Effluent Infiltration Pond	No	NA	No
34	Sewage Treatment Plant Sludge Drying Beds	Yes	Yes	Yes
35	Asphalt Mixing Area, Asphalt Drum Disposal Site (early 1950s to late 1960s)	Yes	Yes	Yes
36	Drum Storage Site and Asphalt Mixing Area (late 1960s to mid-1970s)	Yes	Yes	Yes
37	Drum Storage Site and Asphalt Mixing Area (mid-1970s to present)	Yes	Yes	Yes
38	Waste POL Pit	Yes	Yes	Yes
39	Asphalt Lake	Yes	Yes	Yes
40	Power Plant Sludge Pit	No	NA	No
41	Auto Hobby Shop	Yes	Yes	Yes

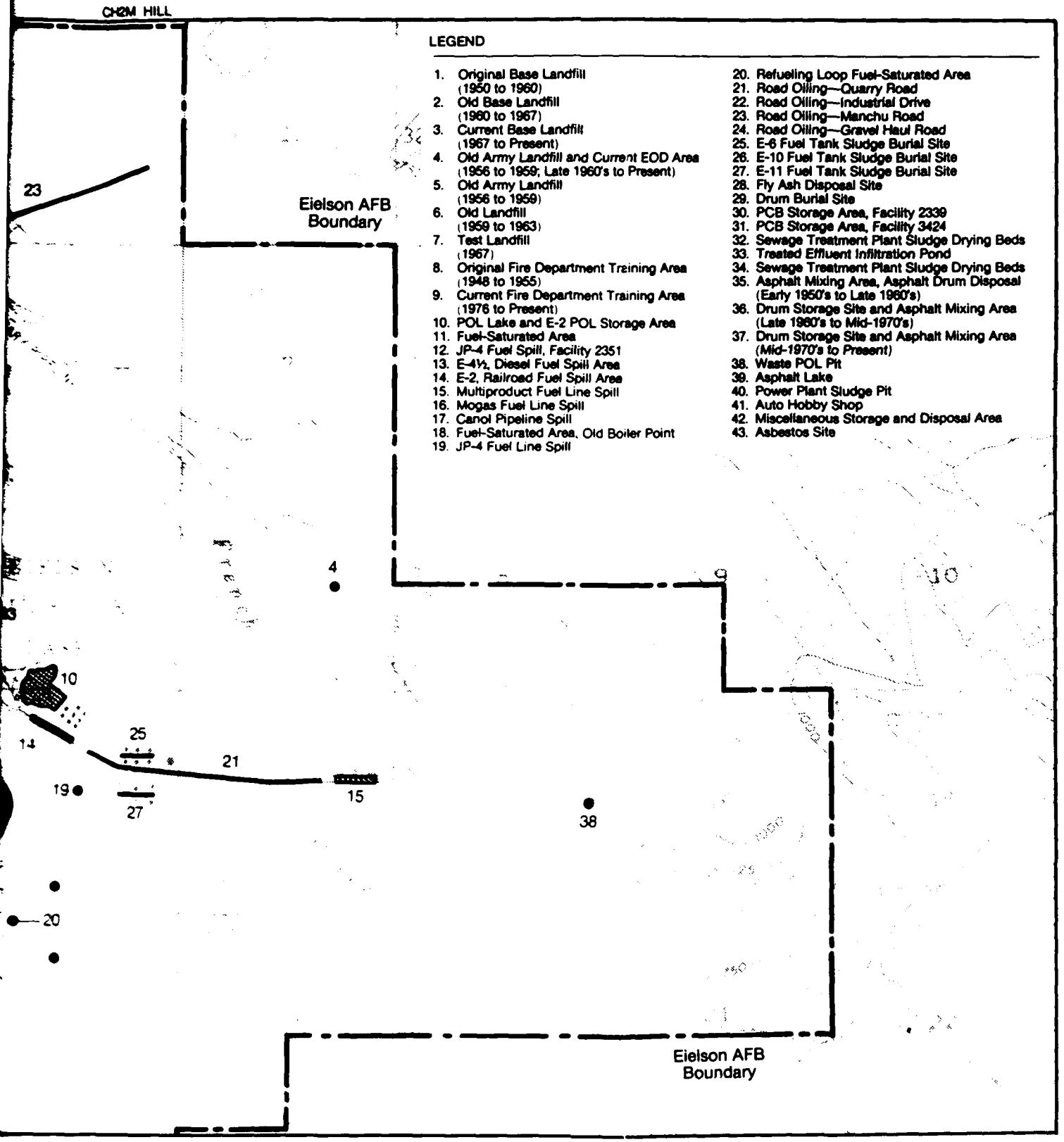
Table 8--Continued

Site No.	Site Description	Potential Hazard		Rated
		Contamination	Migration	
42	Miscellaneous Storage and Disposal Area	Yes	Yes	Yes
43	Asbestos Site	No	NA	No

NA = Not applicable using decision tree methodology.

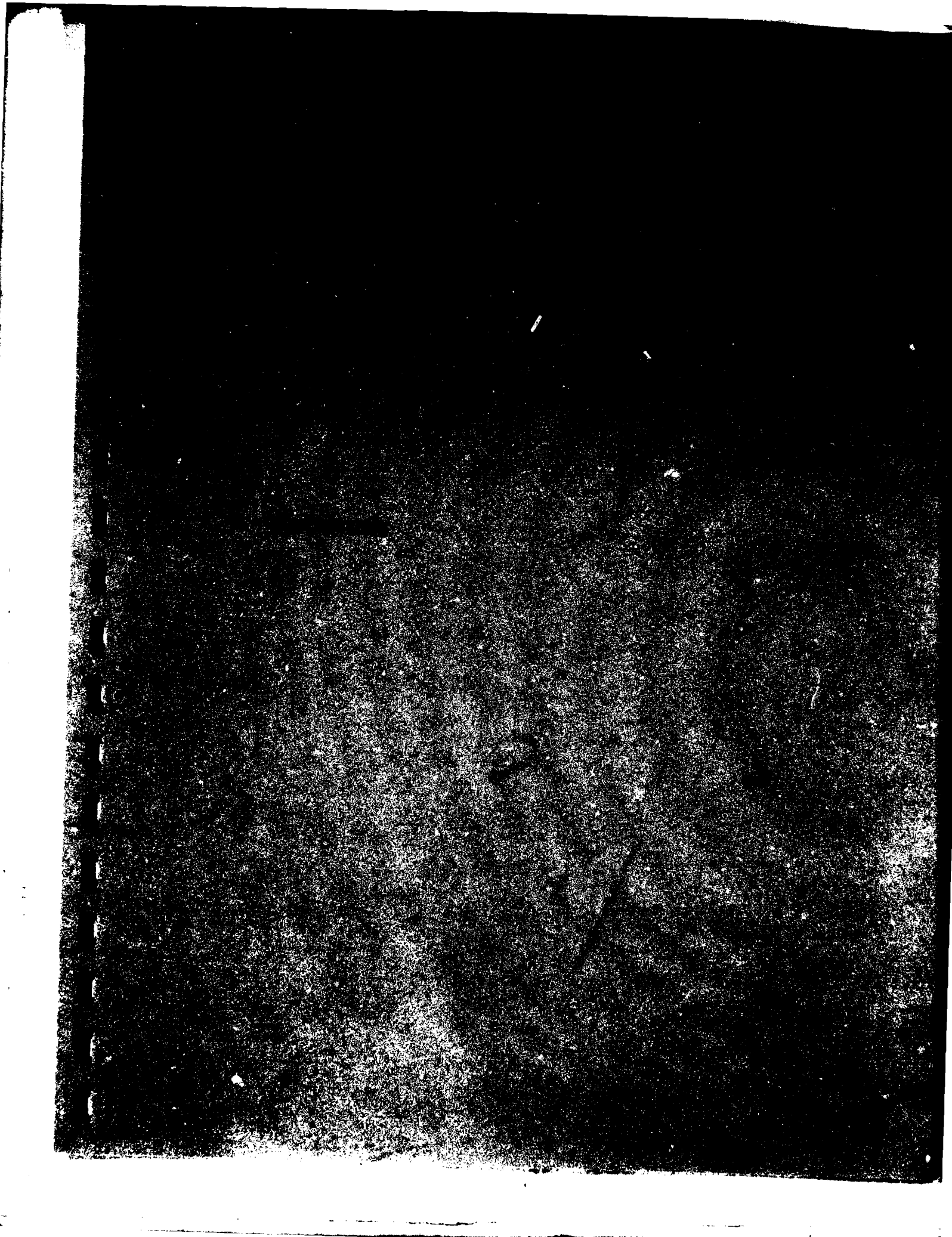


Location of map of identified disposal ar



of identified disposal and spill sites at Eielson AFB.

FIGURE 12.



V. CONCLUSIONS

A. Information obtained through interviews with past and present base personnel, base records, shop folders, and field observations indicates that hazardous wastes have been disposed of on Eielson AFB property in the past.

B. Due to the large fuel storage capacity, the long-standing refueling and defueling mission, and the extreme Alaskan climatic conditions at Eielson AFB, the potential for fuel spills is very high. A total of 14 fuel spill-related sites were identified. These sites include eight fuel spill sites, three sites where a hydrocarbon layer was found floating on the water table, and three sites where a POL-saturated ground surface was observed.

C. Evidence of environmental stress resulting from past fuel spills was observed at Sites No. 10, 15, and 19.

D. The potential for migration of hazardous contaminants is high because of (1) high ground-water table, (2) high soil permeability, (3) the absence of continuing impermeable confining strata in the unsaturated zone above the water table, and (4) low soil absorption.

E. Table 9 presents a priority listing of the rated sites and their overall scores. The following sites were designated as areas showing the most significant potential (relative to other Eielson AFB sites) for environmental impact.

Table 9
PRIORITY LISTING OF DISPOSAL SITES

Site No.	Site Description	Overall Score
10	POL Lake and E-2 POL Storage Area	73
3	Current Base Landfill (1967 to present)	73
11	Fuel-Saturated Area	70
19	JP-4 Fuel Line Spill	67
32	Sewage Treatment Plant Spill Ponds	65
15	Multiproduct Fuel Line	65
9	Current Fire Department Training Area (1976 to present)	64
2	Old Base Landfill (1960 to 1967)	63
18	Fuel-Saturted Area, Old Boiler Plant	63
1	Original Base Landfill (1950 to 1960)	63
39	Asphalt Lake	63
20	Refueling Loop Fuel-Saturated Area	61
8	Original Fire Department Training Area (1948 to 1955)	61
13	E-4-1/2 Diesel Fuel Spill Area	60
41	Auto Hobby Shop	60
36	Drum Storage Site and Asphalt Mixing Area (late 1960s to mid-1970s)	60
37	Drum Storage Site and Asphalt Mixing Area (mid-1970s to present)	60
17	Canol Pipeline Spill	57
38	Waste POL Pit	56
16	MOGAS Fuel Line Spill	56
35	Asphalt Mixing Area and Asphalt Drum Disposal (early 1950s to late 1960s)	55
29	Drum Burial Site	54
24	Road Oiling-Gravel Haul Road	53
21	Road Oiling-Quarry Road	52
22	Road Oiling-Industrial Drive	52
23	Road Oiling-Manchu Road	51
14	E-2, Railroad JP-4 Fuel Spill Area	51
25	E-6 Fuel Tank Sludge Burial Site	51

Table 9--Continued

Site No.	Site Description	Overall Score
27	E-11 Fuel Tank Sludge Burial Site	51
6	Old Landfill (1959 to 1963)	51
42	Miscellaneous Storage and Disposal Area	51
26	E-10 Fuel Tank Sludge Burial Site	50
5	Old Army Landfill (1956 to 1959)	49
34	Sewage Treatment Plant Sludge Drying Beds	48
4	Old Army Landfill and EOD Area (1956 to 1959; late 1960s to present)	47

1. Site No. 10 (POL Lake and E-2 POL Storage Area)

This was the site of a MOGAS fuel spill in 1978 and is a suspected fuel-saturated area. Two MOGAS storage tanks at the E-2 POL storage area (Tanks No. 20 and 21) were detected to be leaking approximately 200 gallons per day. The MOGAS spill is the suspected source of the hydrocarbon layer which can be observed floating on POL Lake. POL Lake is located approximately 200 feet downgradient from the storage tanks and evidence of vegetative stress was observed along the bank adjacent to the storage area.

2. Site No. 3 (Current Base Landfill)

This site has been in use for approximately 27 years. The site was used as a major fire department training area from 1955 to 1976 and has been used as the main sanitary landfill for the entire base from 1967 to present. Hazardous wastes, including waste oils, spent solvents, and paint residues and thinners, were reportedly disposed of at this site.

3. Sites No. 11, 19, 15, 18, 20, 13, 41, 36, 37, 17, 16, and 14 (Potential Fuel-Saturated Area of the Base)

The above fuel spill sites and fuel-saturated areas are all located in one general area of the base as indicated on Figure 14. This southwestern portion of the base encompasses all the major POL storage tanks, the refueling loop, the defueling area of the runway, and the majority of underground fuel lines. Sites No. 13, 14, 15, 16, 17, and 19

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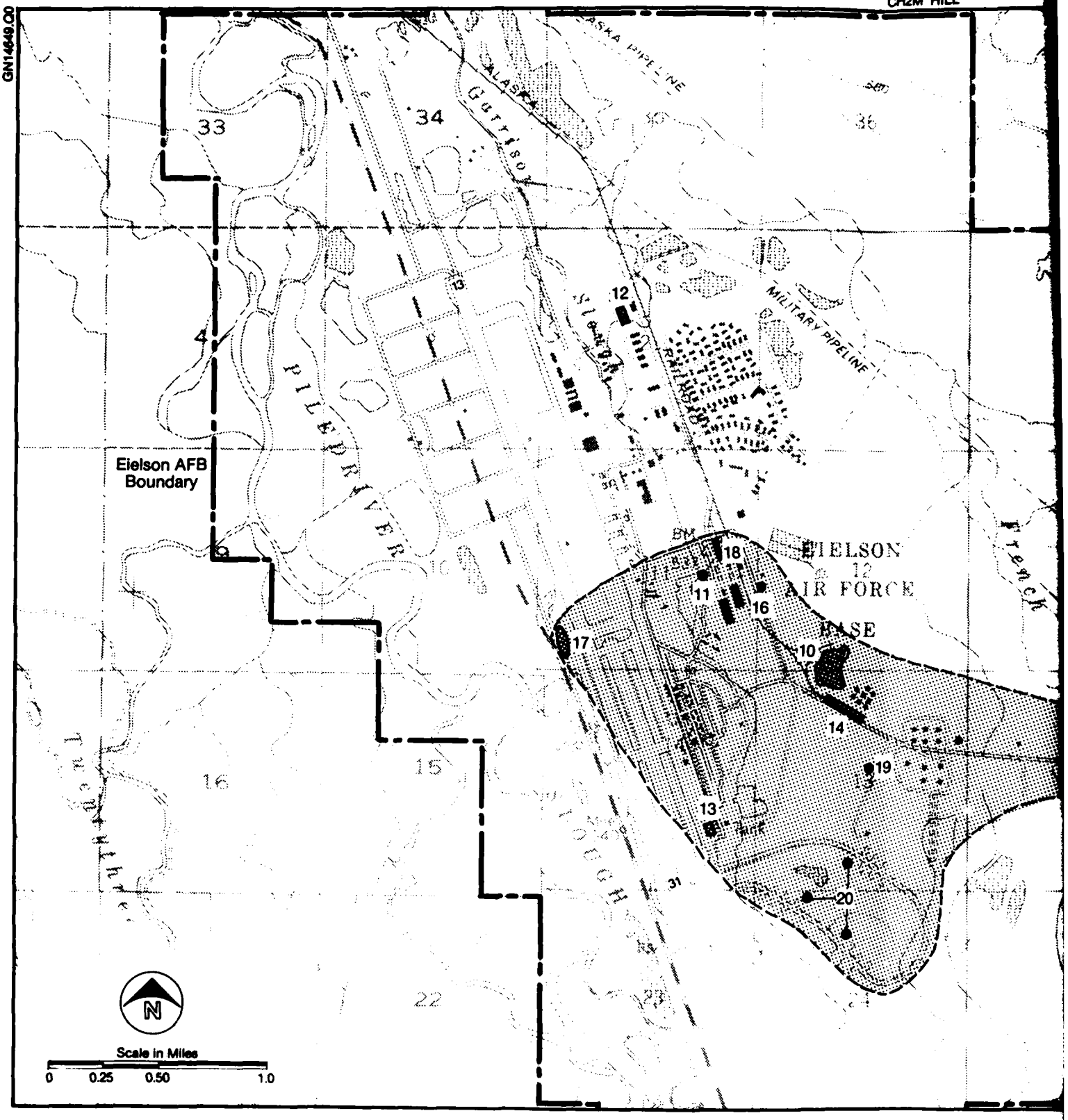
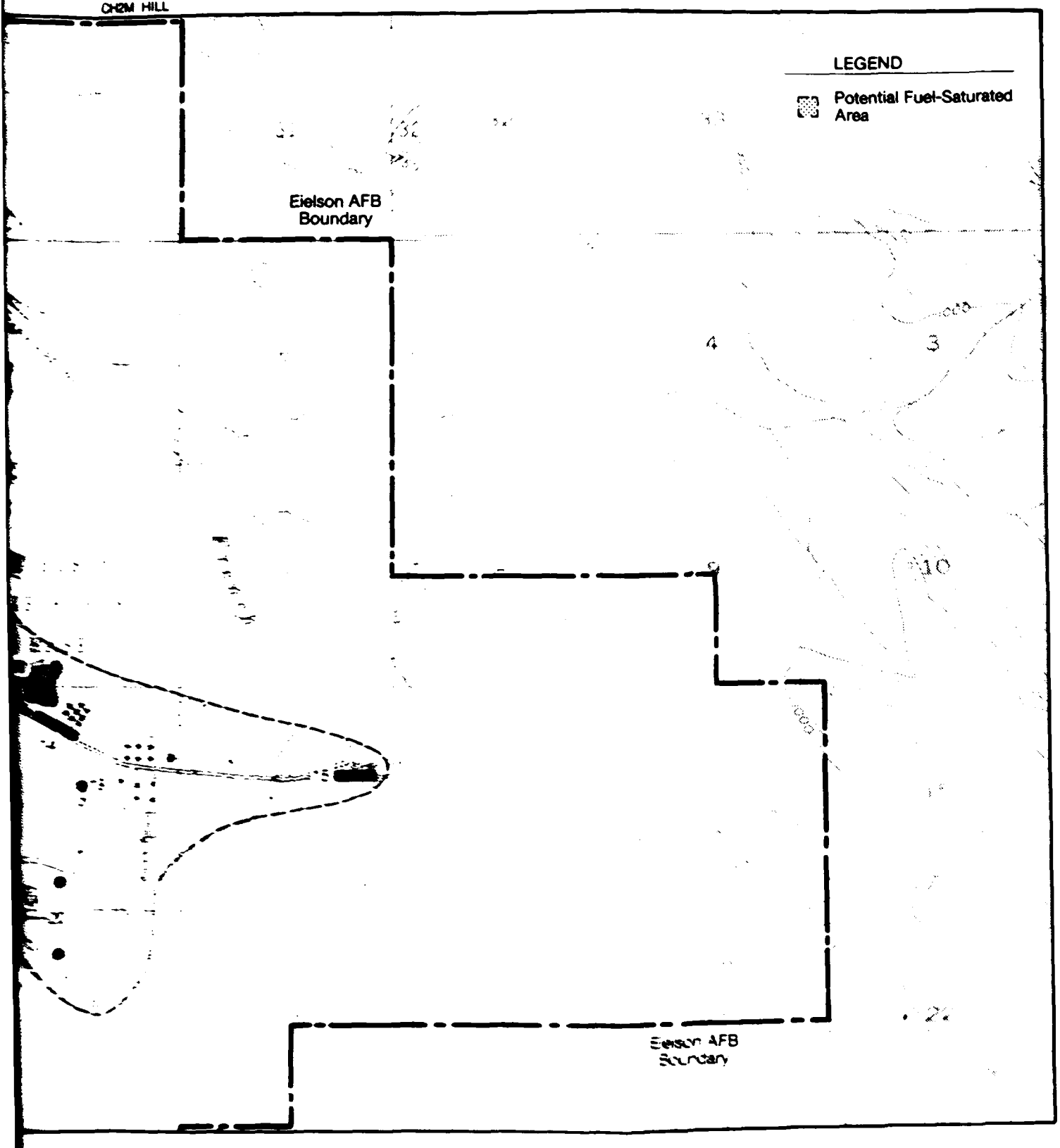


Location of identified fuel spill sites and potential fuel- saturat


CH2M HILL
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Potential Fuel-Saturated Area
Eielson AFB Boundary
Eielson AFB Boundary

FIGURE 14.

are fuel spill sites. Evidence of vegetative stress, including dead trees and shrubs, was observed at Sites No. 15 and 19. Sites No. 11, 18, and 20 are fuel-saturated areas where a hydrocarbon layer was found floating on the water table. Sites No. 36, 37, and 41 are sites where a POL-saturated ground surface was observed. The area of the base depicted on Figure 14 can be treated as one large suspected fuel-saturated area. The types of fuels which may have saturated this area include JP-4, diesel, and MOGAS. As a means of comparison, the above fuel spill sites and fuel-saturated areas have been grouped together and rated as one composite site. The Composite Site received an overall score of 75 (see page I-71 of Appendix I).

4. Site No. 32 (Sewage Treatment Plant Spill Ponds)

The spill ponds have been used intermittently since 1970 to prevent a plant upset. Spills, primarily POL products, are diverted to the unlined ponds and percolate into the soil.

5. Site No. 2 (Old Base Landfill)

This site was the main base landfill from 1960 to 1967. Hazardous wastes, including waste oils, spent solvents, and paint residues and thinners were reportedly disposed of at this site.

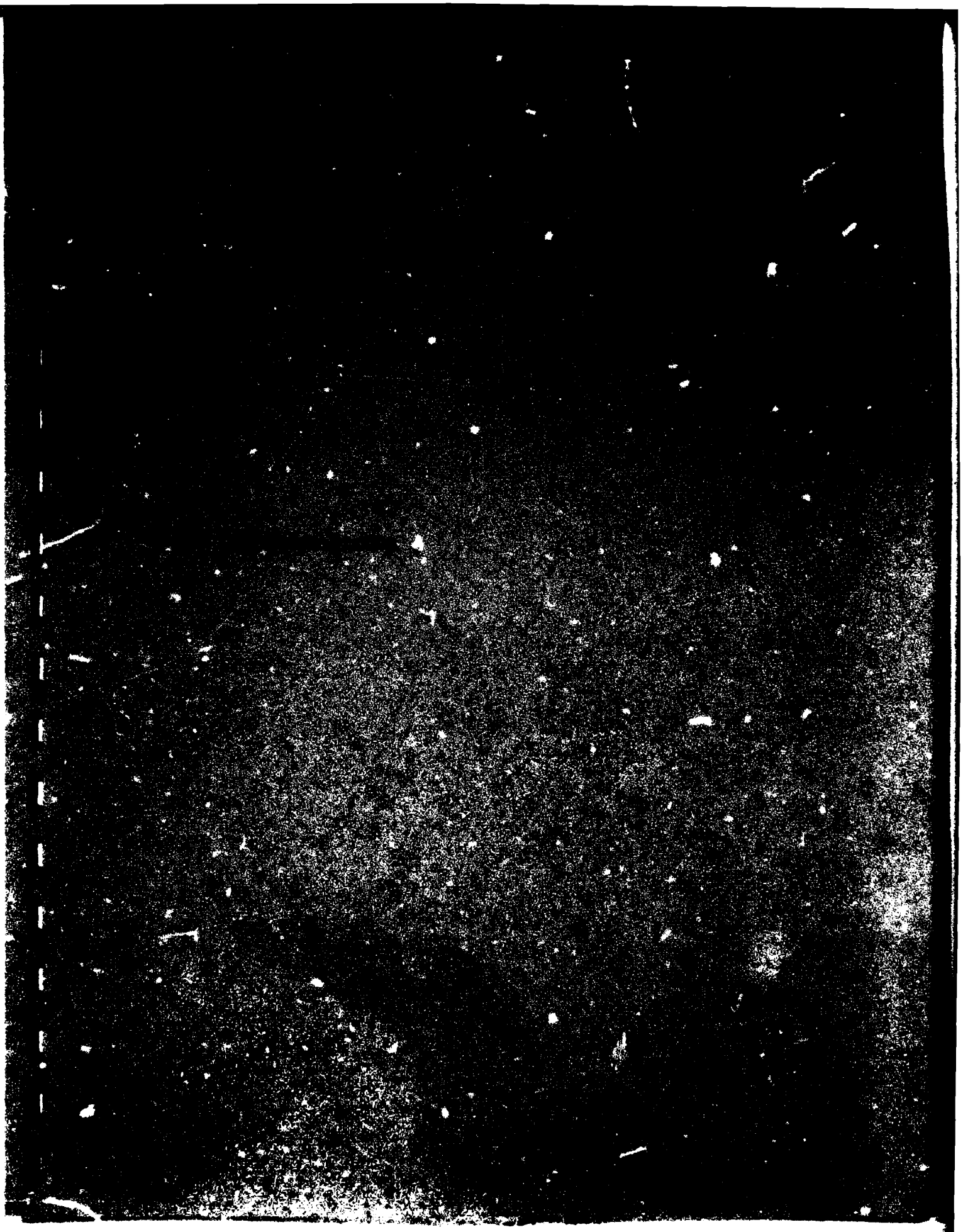
6. Site No. 1 (Original Base Landfill)

This site was the main base landfill from 1950 to 1960. Hazardous wastes, including waste oils, spent solvents, and paint residues and thinners were reportedly disposed of at this site.

F. The remaining sites (Sites No. 4, 5, 6, 8, 9, 21, 22, 23, 24, 25, 26, 27, 29, 34, 35, 38, 39, and 42) are not considered to present significant environmental concerns. Therefore, no Phase II work is recommended.

It should be noted that some sites which do not warrant additional Phase II work have received higher overall scores than the fuel spill sites and fuel-saturated areas which have been recommended for additional Phase II work. The rationale for these recommendations is that 12 of the fuel spill sites and fuel-saturated areas have been grouped together into one composite site (regardless of overall score) because of their close proximity to one another, same potential contaminants, and potential synergistic effect. The Composite Site has been treated as one large suspected fuel-saturated area.

G. The sites which were not rated include Sites No. 7, 12, 28, 30, 31, 33, 40, and 43. No further actions are recommended at these sites.



VI. RECOMMENDATIONS

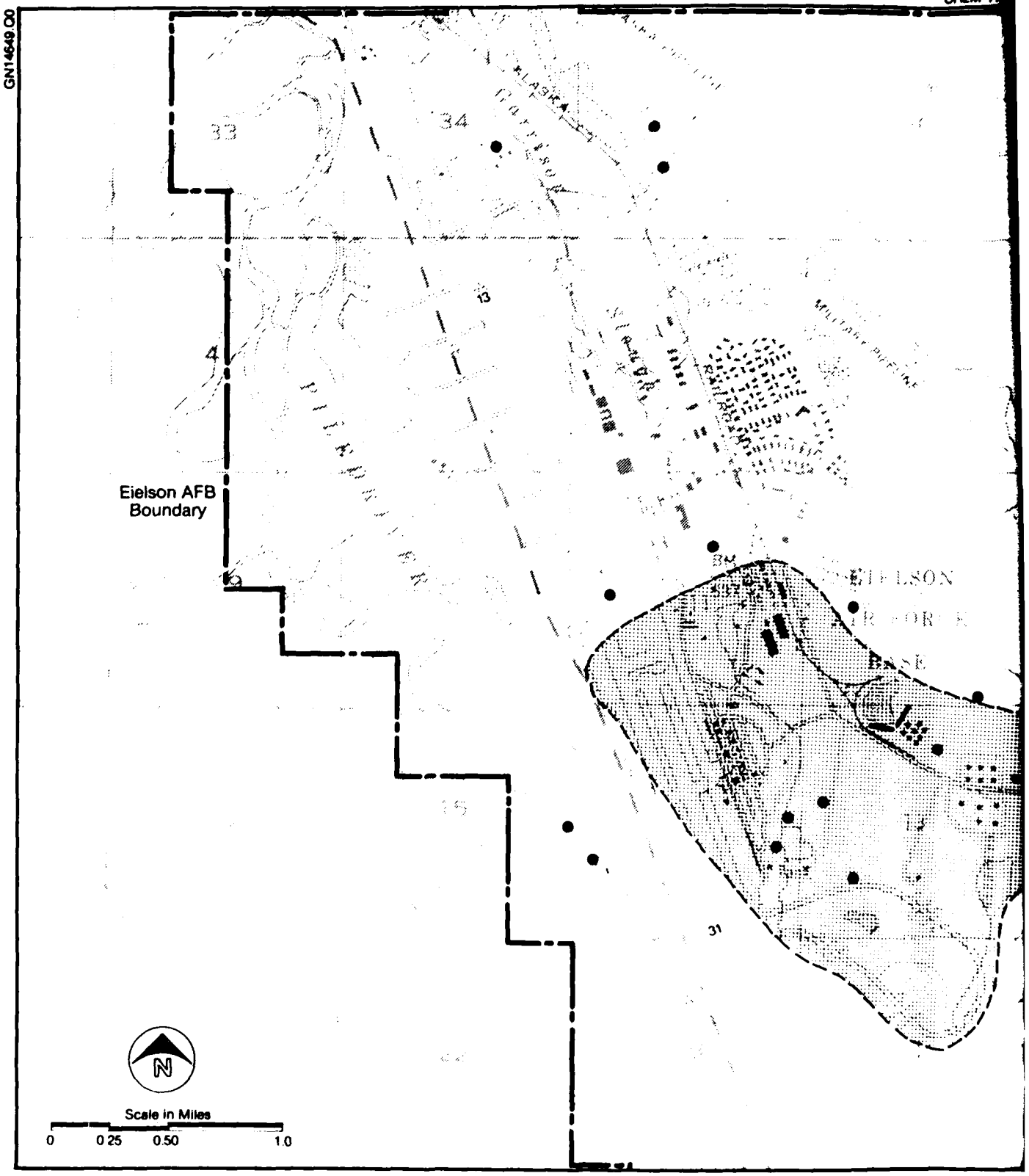
A. Phase II Program

A limited Phase II monitoring program is recommended to confirm or rule out the presence and/or migration of hazardous contaminants. The priority for monitoring at Eielson AFB is considered moderate, since no imminent hazard has been determined.

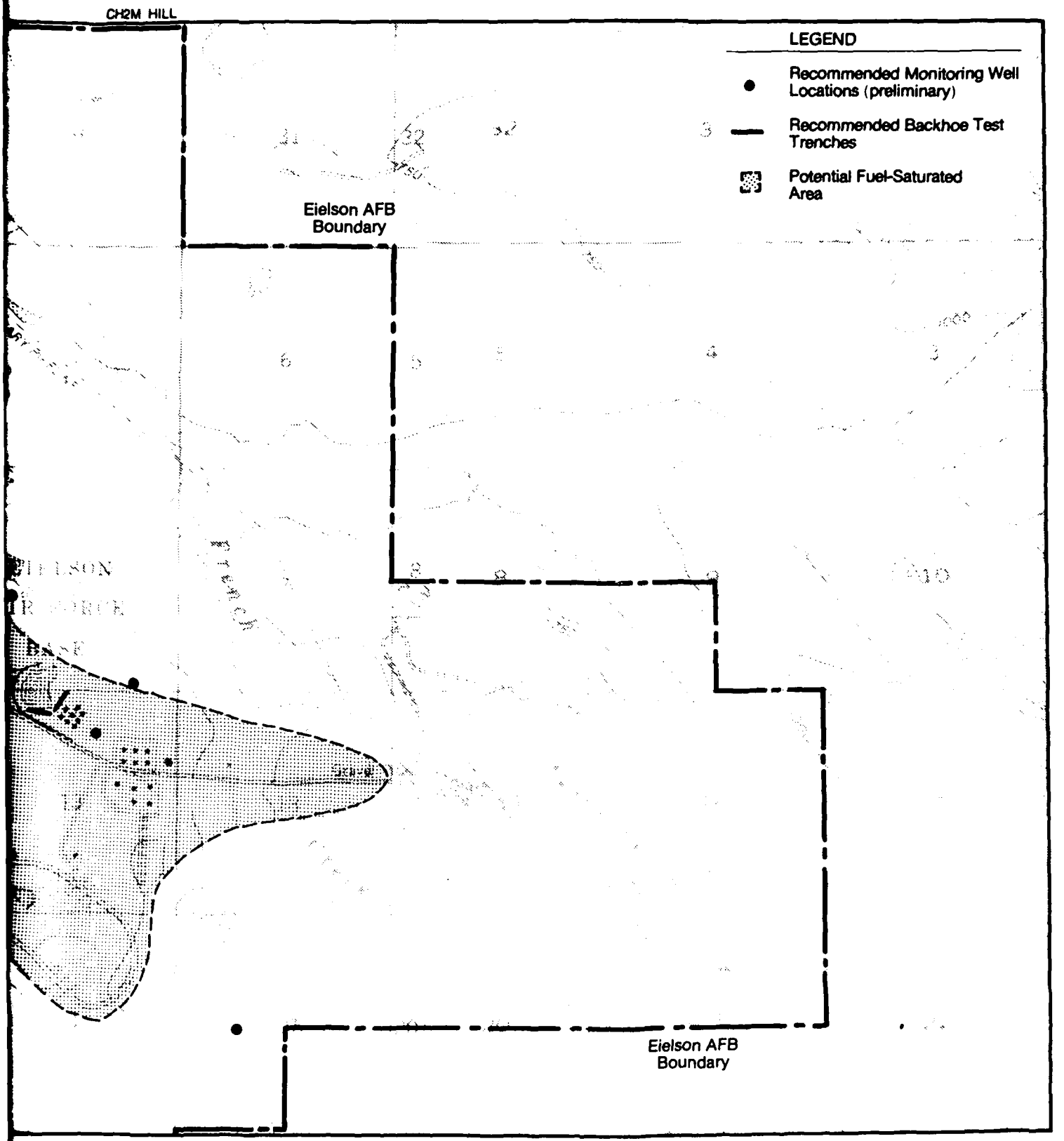
Tables 10 and 11 present a summary of recommended monitoring sites, parameters to be measured, and the rationale for the analyses. Specifically, monitoring is recommended for POL Lake and E-2 POL Storage Area (Site No. 10), Current Base Landfill (Site No. 3), Potential Fuel-Saturated Area of the Base (Sites No. 11, 19, 15, 18, 20, 13, 41, 36, 37, 17, 16, and 14), Sewage Treatment Plant Spill Ponds (Site No. 32), Old Base Landfill (Site No. 2), and Original Base Landfill (Site No. 1). The approximate monitoring well locations are shown on Figure 15.

1. POL Lake and E-2 POL Storage Area (Site No. 10)

It is recommended that one upgradient well be installed and two backhoe test trenches be excavated. The upgradient well should be located approximately halfway between the E-2 and E-6 POL storage areas. In addition to providing background water quality, the upgradient well will confirm or rule out that the source of the POL Lake contamination is from the E-2 POL Storage Area. The upgradient well should be a shallow well approximately 30 feet deep and screened from 1 foot above the water table to the entire depth of 30 feet. One backhoe test trench should be located between POL Lake and the E-2 POL Storage Area and the other trench



Recommended preliminary monitoring



liminary monitoring well locations at Eielson AFB.

FIGURE 15.

Table 10
RECOMMENDED ANALYSES

Monitoring Well Locations	Parameter					
	Volatile Organic Compounds	PCBs	Heavy Metals	Pesticides	Phenols	COD, TOC Oil and Grease
POL Lake and E-2 POL Storage Area (Site No. 10)	X		X[a]			X
Current Base Landfill (Site No. 3)	X	X	X	X	X	X
Potential Fuel-Saturated Area of Base (Sites No. 11, 19, 15, 18, 20, 13, 41, 36, 37, 17, 16, and 14)	X		X[a]			X
Sewage Treatment Plant Spill Ponds (Site No. 32)	X		X		X	X
Old Base Landfill (Site No. 2)	X	X	X	X	X	X
Original Base Landfill (Site No. 1)	X	X	X	X	X	X

[a]Lead only.

Table 11
RATIONALE FOR RECOMMENDED ANALYSES

Parameter	Rationale
Volatile Organic Compounds	Organic solvents used on-base (past and present) and benzene
Phenols	Phenolic cleaner and paint stripper which may have been used in the past
Heavy Metals (lead, nickel, chromium, cadmium, and silver)	Potential sources identified (leaded fuel, battery acid and electrolyte, paint, photographic chemicals)
PCBs	Large quantities of PCBs-contaminated transformer oil and soil handled on Eielson AFB
Pesticides (including DDT and 2, 4-D)	Commonly used at Eielson AFB in the past
COD, TOC, and Oil and Grease	Fuel spill indicators and indicators of nonspecific contamination

between POL Lake and Site No. 14 (E-2 Railroad JP-4 Fuel Spill Area). Both backhoe test trenches should be excavated to a depth approximately 2 feet below the water table and approximately 20 feet in length. The trenches should be located approximately 50 feet from the bank of POL Lake and the excavation done during the summer when the water in the lake is at a lower elevation than the ground-water table. Water samples collected from the upgradient well and the backhoe test trenches should be analyzed for volatile organic compounds, lead, COD, TOC, and oil and grease. The backhoe test trenches should be visually inspected for soil characteristics and evidence of fuel saturation or stratification.

2. Current Base Landfill (Site No. 3)

It is recommended that one upgradient and three downgradient wells be installed. All four wells should be drilled to the entire depth of the aquifer and screened from 1 foot above the water table to the entire saturated thickness of the aquifer. Samples should be collected from various depths, composited, and analyzed for volatile organic compounds, PCBs, heavy metals, pesticides, phenols, COD, and TOC. A sample collected from the top of the water table should be analyzed for oil and grease. Since these wells are screened from 1 foot above the water table and will be analyzed for COD, TOC, and oil and grease, they will provide additional information on the potential fuel-saturated area of the base.

3. Potential Fuel-Saturated Area of Base (Composite Site Includes No. 11, 19, 15, 18, 20, 13, 41, 36, 37, 17, 16, and 14)

As shown on Figure 14, the above fuel spill sites and fuel-saturated areas are all located in one general area of the base. For the purpose of recommending monitoring locations, these sites can be grouped together and treated as one large suspected fuel-saturated area. It is recommended that one upgradient and four downgradient wells be installed. The wells should be shallow wells approximately 30 feet deep and screened from 1 foot above the water table to the entire depth of 30 feet. Samples collected from the wells should be analyzed for volatile organic compounds, lead, COD, TOC, and oil and grease. It should be noted that the one well upgradient of POL Lake and E-2 POL Storage Area and the one well upgradient and three wells downgradient of the Current Base Landfill are all located within the potential fuel-saturated area and will provide additional monitoring information.

4. Sewage Treatment Plant Spill Ponds (Site No. 32)

It is recommended that one downgradient well be installed adjacent to the spill ponds. The well should be drilled to a depth of approximately 100 feet and screened from 1 foot above the water table to the entire saturated thickness of the aquifer. Samples collected from the well should be analyzed for volatile organic compounds, heavy metals, phenols, and COD, and TOC. A sample collected from the top of the water table should be analyzed for oil and grease.

5. Old Base Landfill (Site No. 2) and Original Base Landfill (Site No. 1)

It is recommended that one upgradient well and one downgradient well be installed at each of the above sites. The wells should be drilled to the entire depth of the aquifer and screened from 1 foot above the water table to the entire saturated thickness of the aquifer. Samples should be collected from various depths, composited, and analyzed for volatile organic compounds, PCBs, heavy metals, pesticides, phenols, COD, and TOC. A sample collected from the top of the water table should be analyzed for oil and grease.

6. The final details of the monitoring program, including the specific locations of ground-water monitoring wells, will be finalized as part of the Phase II program.

7. In the event that contaminants are detected, a more extensive field survey program should be implemented to determine the extent of contaminant migration.

B. In-House Environmental Program

In addition to the limited Phase II monitoring, it is recommended that the following program be conducted by the base.

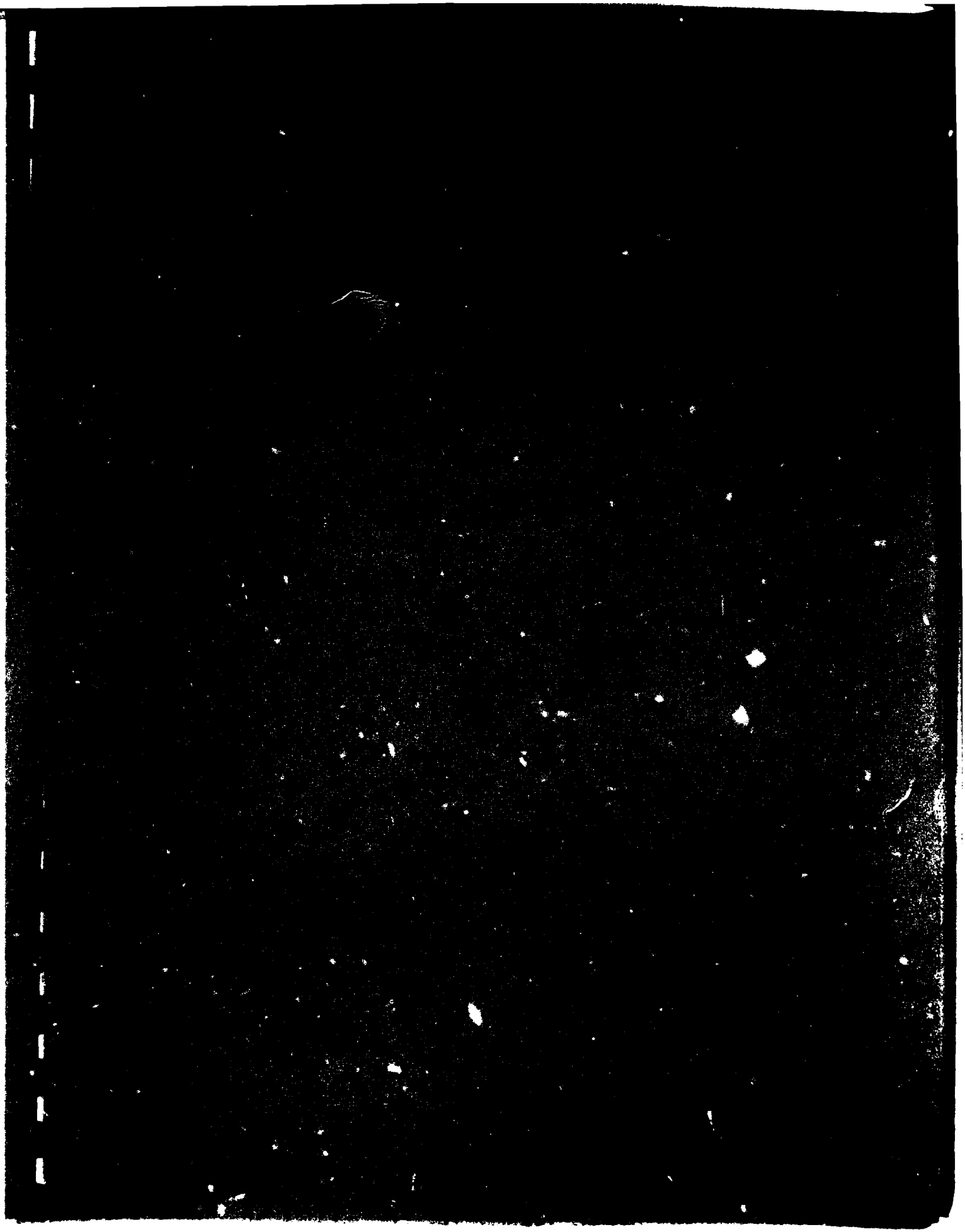
1. The base should continue its program of sampling and analysis of active base water supply wells. In addition to the analyses currently performed, it is recommended that volatile organic compound, TOC, and oil and grease analyses also be conducted

on an annual basis. This monitoring is recommended as a precautionary measure to determine if a long-term contaminant migration potential exists.

2. A waste sludge sample from the base sewage treatment plant should be collected and analyzed for EP toxicity since no leachate collection system exists below the sludge drying beds.

C. ADDITIONAL RECOMMENDATIONS

It is recommended that the 55-gallon drums stored at Sites No. 36 and 37 be inventoried and identified to DPDO for disposal.



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23. Oil/Grit Separator Survey, Eielson AFB, Alaska, July 1978.

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GARY E. EICHLER
Hydrogeologist

Education

M.S., Engineering Geology, University of Florida, 1974
B.S., Construction and Geology, Utica College of Syracuse University, 1972

Experience

Mr. Eichler has been responsible for ground-water projects for both water supply and effluent disposal. Studies have included site selection, well design, construction services, monitoring and testing programs, determination of aquifer characteristics, and well field design. In addition, Mr. Eichler has conducted numerous studies to determine pollution potential of toxic and hazardous wastes. Types of projects for which Mr. Eicher has been directly responsble for include:

- Exploration drilling, testing, and design of well fields for potable water supply with an installed capacity of over 65 mgd.
- Determination of pollutant travel time and direction of movement at hazardous waste disposal sites.
- Geophysical logging and testing programs for deep disposal wells for both municipal and hazardous waste.
- Aquifer modeling studies completed to predict effects of future ground-water withdrawal.
- Determination of saltwater intrusion potential and design of associated monitoring programs.

Prior to joining CH2M HILL in 1976, Mr. Eichler was an engineering geologist with Environmental Science and Engineering, Inc., of Gainesville, Florida. Responsibilities there included project management, soils investigations, siting studies, ground-water and surface-water reports, and Federal and state environmental impact studies. He has professional capabilities in the following areas.

- Hydrogeology. Water supply well location, aquifer testing, well field layout, injection well testing and monitoring program design, and well construction inspection.
- Water resources inventory. Potentiometric mapping, water yield, and availability determinations.
- Site investigations. Determination of subsurface conditions, primarily in soil media. Determination of stratigraphic correlation and associated physical properties for engineering design.
- Environmental permitting. Federal, state, regional, and local permit studies associated with industrial and mining projects.

GARY E. EICHLER

- Clay mineralogy. Clay mineral reactions primarily associated with lime stabilization for highways and other engineering projects. Participated in a Brazilian highway project and developed laboratory analysis for lime-soil reactions.

- Engineering geology. Geologic exploration, soil property determinations for engineering design, and water and earth materials interactions associated with construction.

- Geophysics. Well logging and interpretation.

Mr. Eichler directed the laboratory analysis of tropical soils to determine engineering properties and reaction potential with lime additives for a Brazilian highway project. He also assisted in the preparation and presentation of a seminar on lime stabilization sponsored by the National Lime Association.

Membership in Organizations

American Institute of Professional Geologists
American Water Resources Association
Association of Engineering Geologists
Geological Society of America
Southeastern Geological Society
National Water Well Association

Publications

Engineering Properties and Lime Stabilization of Tropically Weathered Soils. M.S. thesis, Department of Geology, University of Florida. August 1974.

Certifications

Certified Professional Geologist
Certificate No. 4544

GREGORY T. MCINTYRE
Environmental Engineer

Education

M.S., Environmental and Water Resources Engineering, Vanderbilt University, 1981
B.S., Environmental Engineering, University of Florida, 1980

Experience

Mr. McIntyre's responsibilities at CH2M HILL involve projects dealing with laboratory and pilot treatability studies, industrial waste treatment processes, and hazardous wastes. Since joining the firm in September 1981, his project-related assignments have included:

- Participation in wastewater characterization, laboratory pilot plant treatability study, evaluation of existing pretreatment, and conceptual design for equalization and aerobic biological treatment of industrial wastewater for Hercules, Inc.

- Hazardous materials disposal site records search for the U.S. Air Force to assess the potential for hazardous contaminant migration from past disposal practices and to recommend follow-up actions.

While in graduate school working as a research assistant, some of Mr. McIntyre's activities included:

- Researching the removal of heavy metals, including copper, zinc and trivalent chromium, using a large-scale adsorbing colloid foam flotation pilot plant.

- Experimental verification of the mathematical model of a continuous flow flotation column.

Professional Registration

E.I.T., Florida

Membership in Organizations

American Water Works Association
Water Pollution Control Federation
Tau Beta Pi

Publications

"Inexpensive Heavy Metal Removal By Foam Flotation." (Coauthors E. L. Thackston, J. J. Rodriguez, and D. J. Wilson). *Proceedings of the 35th Annual Purdue Industrial Waste Conference*, May 1981. *Proceedings of the International Conference on Heavy Metals in the Environment*, Amsterdam, September 1981. *Proceedings of the 2nd Mediterranean Congress of Chemical Engineering*, Barcelona, Spain, October 1981.

GREGORY T. MCINTYRE

"Copper Removal by an Adsorbing Colloid Foam Flotation Pilot Plant." (Coauthors E. L. Thackston, J. J. Rodriguez, and D. J. Wilson). *Separation Science and Technology*. (In Press)

"Experimental Verification of the Mathematical Model of a Continuous Flow Flotation Column." (Coauthors J. E. Kiefer, J. J. Rodriguez, and D. J. Wilson). *Separation Science and Technology*. (In Press)

"Pilot Plant Study of Copper, Zinc, and Trivalent Chromium Removal by Adsorbing Colloid Foam Flotation." M.S. Thesis, Vanderbilt University, 1981.

JANE DYKZEUL GENDRON
Biologist

Education

B.A., Biology (emphasis on Marine Biology) San Francisco State University 1976

Experience

Ms. Gendron is a general biologist in the environmental sciences department of CH2M HILL. Her experience consists of studies in freshwater and marine biology and ecology, water quality sampling and analysis, and terrestrial ecology. She has participated in the assessment of the ecological impacts of many industrial and municipal developments.

Ms. Gendron's experience includes the following:

- Washington State Department of Ecology. Field data collection, laboratory water quality analysis, sanitary surveying, and report preparation for the bacteriological study of Willapa Bay.
- U.S. Air Force, West Coast bases. Assessed the potential for migration of hazardous material through natural systems at several west coast Air Force bases during Phase 1 of the Air Force Installation Restoration Program.
- Pacific Gas Transmission, San Francisco, California. Aquatic biology task leader in the selection of a natural gas pipeline corridor route in Wyoming, Utah, Nevada, and California.
- Metropolitan Service District, Portland, Oregon. Prepared preliminary site descriptions and identified sensitive species and systems occurring at or near several proposed sanitary landfill sites.
- Ventura Regional County Sanitation District, Oxnard, California. Field data collection, laboratory analysis, and report preparation for application for waiver of secondary sewage treatment requirements.

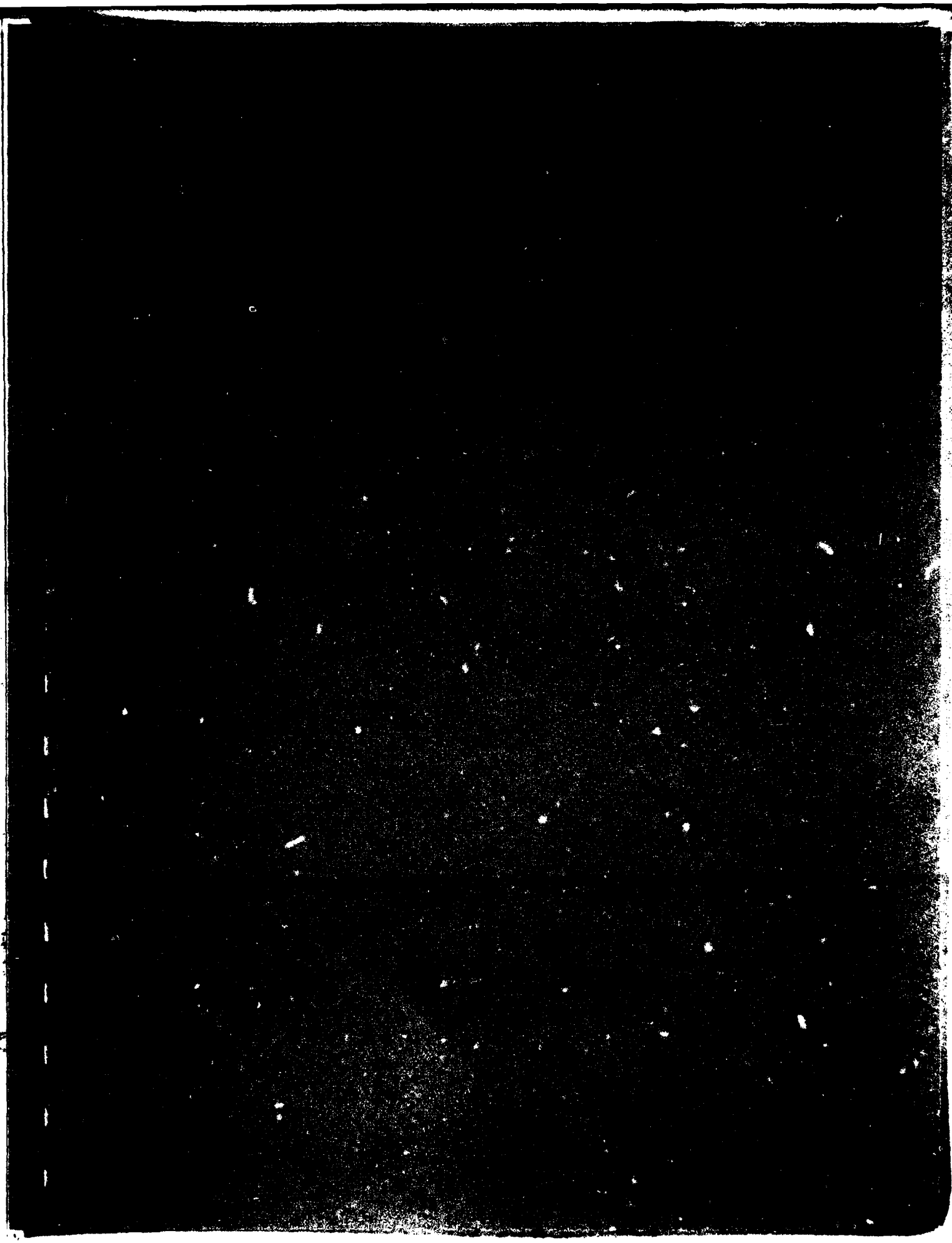
Before joining CH2M HILL, Ms. Gendron worked for the University of Southern California's Catalina Marine Science Center, where she designed and directed a reconnaissance survey of the terrestrial and marine ecosystems along 26 miles of coastland and was involved in an ecological assessment of impacts of the City of Avalon's marine sewage outfall.

Membership in Professional Organizations

American Fisheries Society
American Institute of Biological Sciences
Western Society of Naturalists

Publications (Authored as Jane E. Dykzeul)

"Reconnaissance Survey—Santa Catalina Island; Area of Special Biological Significance—Subarea 1." State of California Department of Fish and Game. Report to California State Water Quality Control Board. May 1978. 130 pp.



Appendix B
OUTSIDE AGENCY CONTACT LIST

1. Geophysical Institute, University of Alaska
   Fairbanks, Alaska
   Mr. Richard Reger
   907/479-7496

2. Cold Regions Research Engineering Lab
   University of Alaska
   Fairbanks, Alaska
   Mr. Larry Johnson
   907/479-7637

3. Department of Interior
   Anchorage, Alaska
   Mr. Lou Jers
   907/271-3632

4. U.S. Geological Survey
   Anchorage, Alaska
   Mr. Max Brewer
   907/276-4566

5. Institute of Water Resources, University of Alaska
   Mr. Robert Carlson
   907/479-7775

6. Alaska Department of Natural Resources
   Fairbanks, Alaska
   Mr. Steve Molk
   907/479-2243

7. U.S.D.A. Soil Conservation Service
   Fairbanks, Alaska

8. Department of Environmental Conservation
   Northern Regional Office
   Fairbanks, Alaska
   Mr. Jeff Mach
   907/452-1714

9. U.S. Fish and Wildlife Service
   Anchorage, Alaska
   Mr. Howard Metsker
   907/263-3510

10. Department of Fish and Game, State of Alaska
    Fairbanks, Alaska
    Mr. Larry Jennings, Mr. Jerry Hallberg, Mr. Scott Grundy
    907/452-1531

11. Alaska Department of Natural Resources
    Lands Division
    Fairbanks, Alaska
    Mr. Jeff Pederson
    907/479-2243

12. U.S. Bureau of Land Management
Fairbanks, Alaska
Ms. Karen Pope
907/356-2025

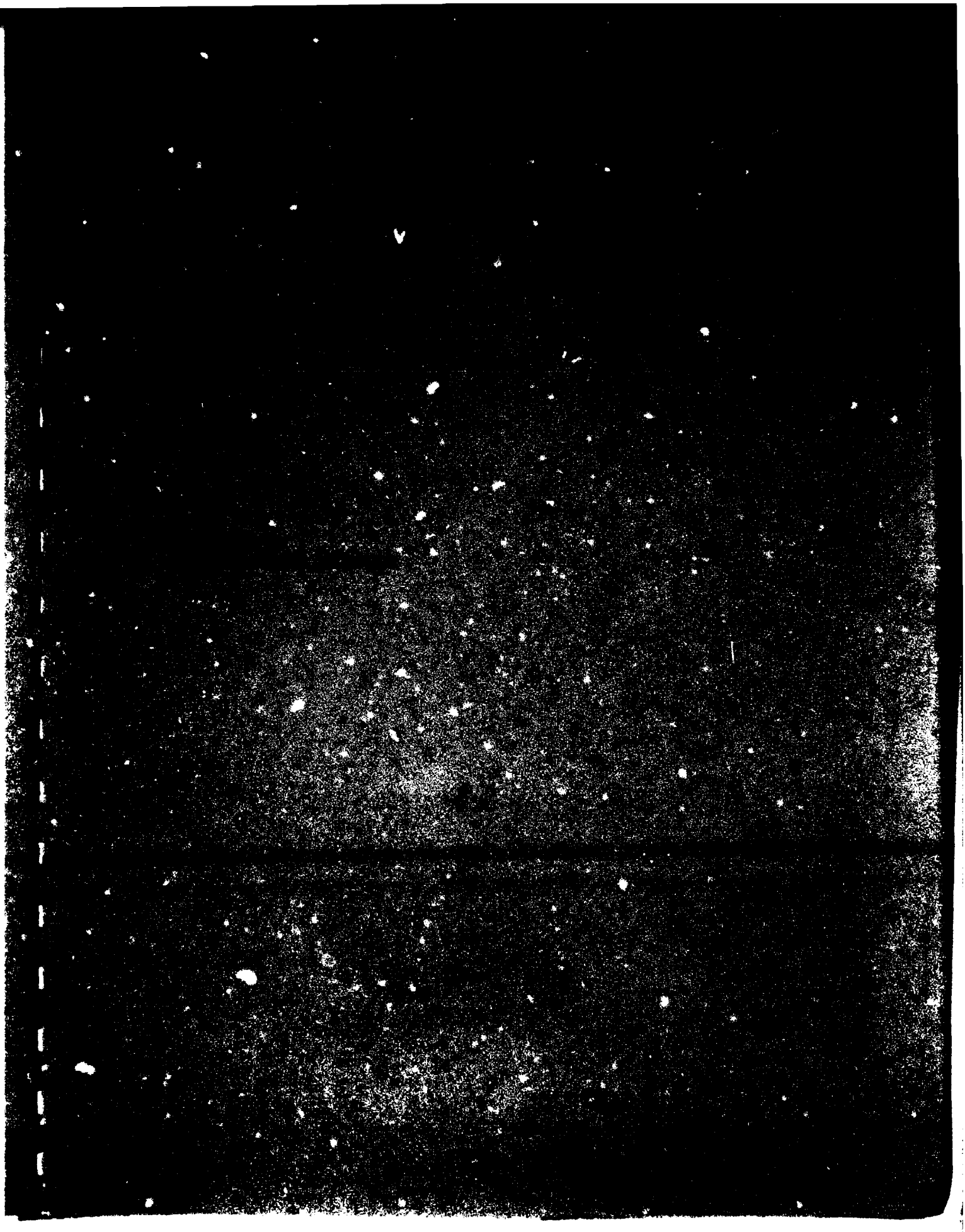
13. Alaska Public Safety Department
Fairbanks, Alaska
Sgt. Rottermunt
907/452-2114

14. U.S. Department of Agriculture, Forest Service
Fairbanks, Alaska
Mr. John Zasada
907/474-7443

15. U.S. National Weather Services
Fairbanks, Alaska
Mr. Ted Matheau
907/452-1796

Appendix C
EIELSON AFB RECORDS SEARCH INTERVIEW LIST

Interviewee	Area of Knowledge	Years at Installation
1	Sanitary Services	24
2	Entomology	9
3	Central Heating and Power Plant	30
4	Central Heating and Power Plant	12
5	Fuels Management	11
6	Fuels Maintenance	12
7	Environmental Coordination	2
8	EOD	2
9	Transportation Operation	22
10	Plumbing Shop	27
11	Fire Department	9
12	Equipment Operator	30
13	Central Heating and Power Plant	32
14	Equipment Operator	16
15	Carpentry Shop	27
16	Exterior Electric	26
17	Equipment Operator	29
18	Civil Engineering	15
19	Fuels Maintenance	28
20	Flightline Maintenance Operation	19
21	Bioenvironmental Engineering	2
22	Facilities Engineering	4
23	Operations and Maintenance	29
24	Electric and Battery Shop	10
25	NDI Lab	2
26	Bioenvironmental Engineering	2
27	Sewage Treatment Plant	10



Appendix D
INSTALLATION HISTORY

Ladd Field, which is directly adjacent to Fairbanks, was activated in 1939 and became the principal air base in Interior Alaska during and immediately after World War II. However, Ladd Field was unsuitable for upgrading to meet Strategic Air Command requirements and a new site was sought for expansion and development. A satellite field of Ladd Field called Mile 26 was selected. Initial construction on Mile 26 was started in August 1943 and the original base completed in October 1944. The field was used primarily to transfer lend-lease aircraft to the Russians.

As the end of world War II approached, Mile 26 was deactivated for a short period of time and then reopened in September 1946. A construction program during the period from 1947 to 1949 extended the west runway to its present 14,512 feet and constructed various taxiways and aprons. The base was officially named Eielson Air Force Base in honor of Carl Ben Eielson, a pioneer Alaskan and Arctic aviator, in February 1948. A third round of construction, which built the majority of base facilities in existence today, began in 1949 and was essentially complete by the end of 1954. Construction since that time has consisted of additional family housing and scattered base facilities.

Ladd Field was deactivated in 1961 and some of its functions and personnel were transferred to Eielson AFB. Ladd Field was then transferred to the U.S. Army and renamed Ft. Wainwright making Eielson AFB the only Air Force base north of the Alaska Range.

Primary Mission

The 343rd Composite Wing is the current host unit at Eielson AFB. The primary mission is to provide trained and equipped tactical air support forces for air strike control

and liaison in direct support of ground elements assigned/ attached to the Alaskan Air Command.

Tenant Mission

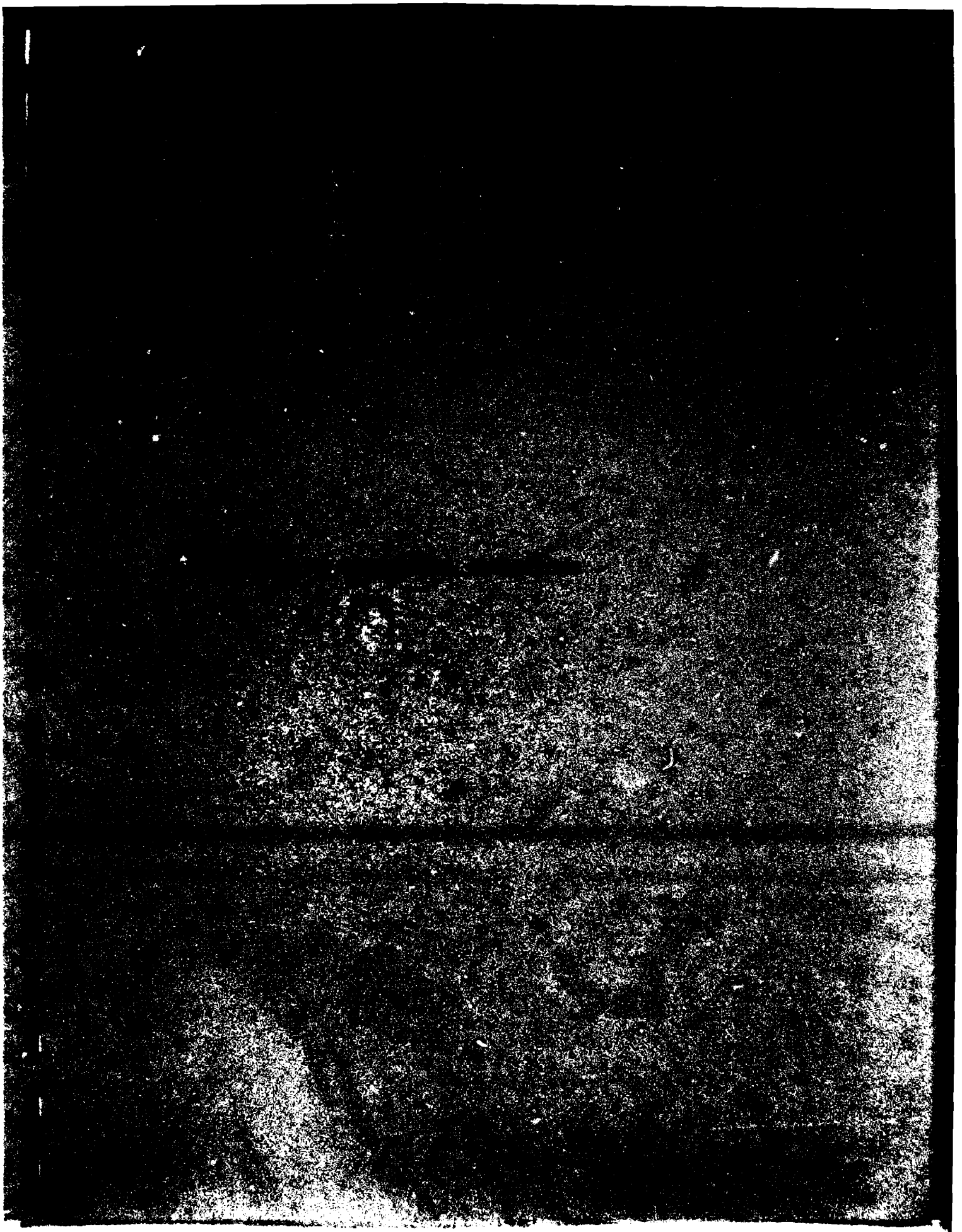
The major tenants at Eielson AFB and their missions are summarized below:

6th Strategic Wing--The mission of the 6th Strategic Wing is to develop and maintain operational capability to permit the conduct of strategic warfare according to the emergency war order. In the accomplishment of this mission, the Wing is tasked to conduct global reconnaissance operations and provide air refueling support for operations in Alaska and adjoining areas.

1995th Communications Squadron--The mission of the 1995th Communications Squadron is to provide communications/ electronics systems and air traffic control support as required to support the mission of Eielson AFB and the Alaskan Air Command.

Detachment 460, 1035th Technical Operations Group--This group is an operational organization having worldwide responsibilities. Its units are involved in the exploration, measurement, and tabulation of the effects of natural phenomena on the physical structure of the earth and its atmosphere and in the possible application of such events toward the improvement of military capabilities.

6985th Electronic Security Squadron--The mission of the 6985th Electronic Security Squadron is to provide communications support to U.S. Forces. This unit employs techniques and materials designed to ensure that air-to-air and air-to-ground communications are reliable and secure.



Appendix E
MASTER LIST OF INDUSTRIAL OPERATIONS

Name	Present Location[a] (Fac. No.)	Handles Hazardous Materials	Generates Hazardous Waste	Current Treatment/Storage/Disposal Methods
343rd Headquarters Squadron				
Arts and Crafts Center	3360			
Auto Hobby Shop No. 1	3360	X	X	DPDO
Auto Hobby Shop No. 2	4298	X	X	DPDO
Wood Hobby Shop	2206			
Marksmenship Training	2204	X	X	DPDO; consumed in use
Life Support Section	1221	X		Consumed in use
Boat Shop	4231	X	X	DPDO; consumed in use
343rd and 6th Consolidated Aircraft Maintenance Squadron				
Avionics Shop	1138	X		Consumed in use
Jet Engine Propulsion Shop	1124	X	X	DPDO
Aircraft Generation Branch	1226, 1232, 1300	X	X	DPDO; oil/water separator to sanitary sewer
AGE Maintenance Shop	1152	X	X	DPDO
NDI Lab	1141	X	X	DPDO; sanitary sewer; silver recovery at base photo lab
Missile Maintenance Shop	1303	X		Consumed in use
Munitions Maintenance Shop	6122, 6159	X	X	DPDO
Welding Shop	1141			
Machine Shop	1141			
Environmental Systems Shop	1141	X		Consumed in use
Corrosion Control Shop	1141	X	X	DPDO; consumed in use
Pneudraulics Shop	1141	X	X	DPDO
Structural Repair Shop	1141			
Survival Equipment Shop	1161	X		Consumed in use
AGE Dispatch	1125, 1127, 1128	X	X	DPDO; consumed in use
Repair and Reclamation Shop	1140	X	X	DPDO
Fuel Systems Repair	1120	X		Consumed in use
PME Lab	3386	X	X	DPDO
Electric/Battery Shop	1141	X	X	DPDO; neutralization to sanitary sewer
SAC AGE Support	1135, 1136	X	X	DPDO
343rd Transportation Squadron				
General Vehicle Maintenance	3213	X	X	DPDO
Welding Shop	3213			
Paint Shop	3213	X	X	DPDO; consumed in use
Machine Shop	3213	X	X	DPDO
Heavy/Special Equipment Maintenance	2171	X	X	DPDO; oil/water separator to sanitary sewer
Battery Shop	2171	X	X	Neutralization to sanitary sewer
Heavy Equipment Welding Shop	2171			
Motor Pool	2351	X	X	DPDO; oil/water separator to sanitary sewer
Refueling Maintenance Shop	2351	X	X	DPDO; oil/water separator to sanitary sewer
Railroad Operations	3383	X	X	DPDO

[a]Information on the past locations of industrial shops was not available.

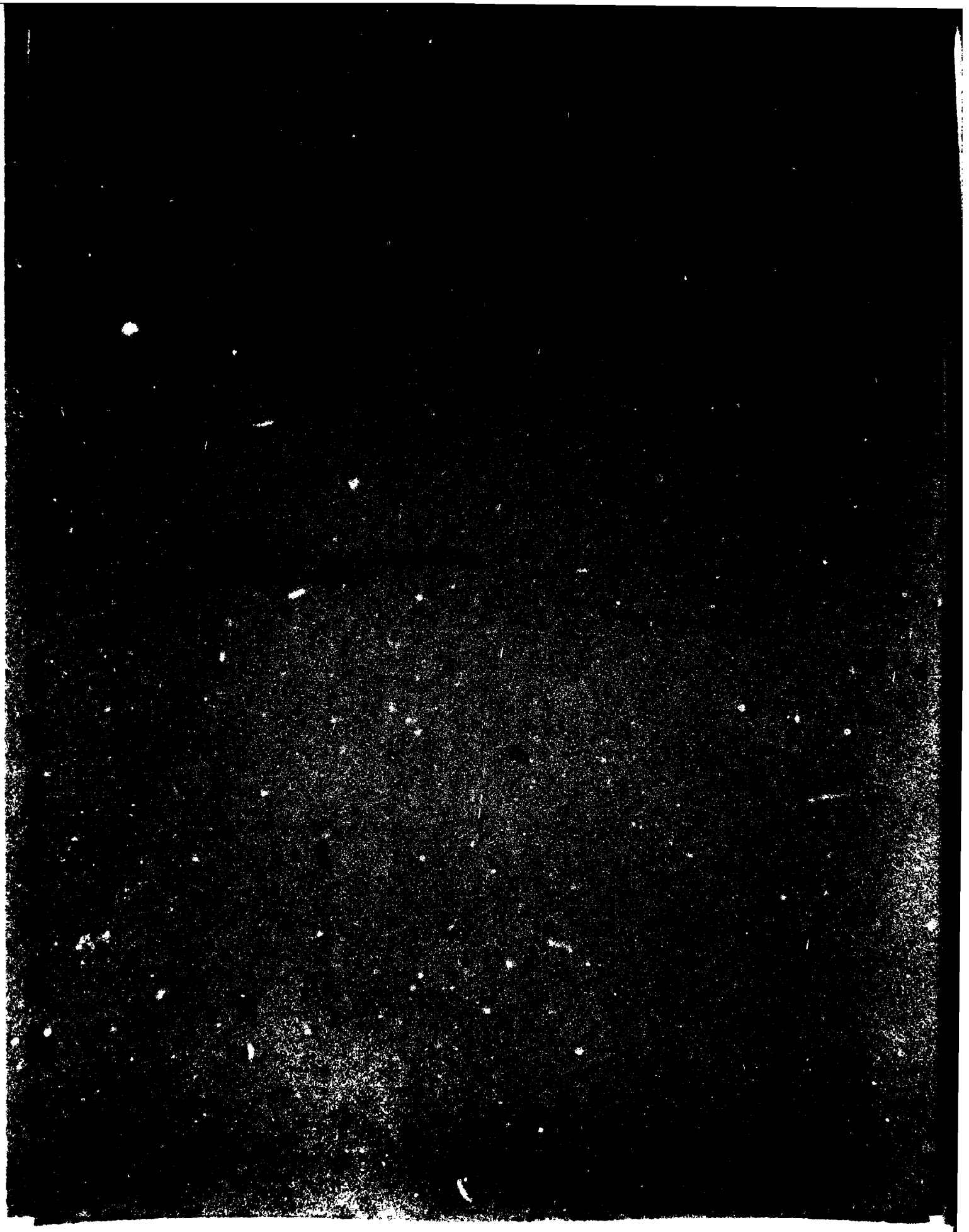
Name	Present Location[a] (Fac. No.)	Handles Hazardous Materials	Generates Hazardous Waste	Current Treatment/Storage/Disposal Methods
343rd Civil Engineering Squadron				
Paint Shop	6214	X	X	DPDO; sanitary sewer
Liquid Fuels Maintenance	1231	X		
Sanitary Treatment Plant	2316	X		
Entomology	4371	X		Consumed in use
Water Treatment Plant	3228			
Metals Processing Shop	2350	X	X	DPDO
Plumbing Shop	2350	X		Consumed in use
Central Heating and Power Plant	6203	X	X	DPDO
Carpenter Shop	6214			
Heating Maintenance	2350			
Refrigeration Shop	2350	X		Consumed in use
Pavement and Grounds	2275	X	X	DPDO
Fire Extinguisher Maintenance	1206	X		Consumed in use
Fire Station No. 1	1206	X		Consumed in use
Fire Station No. 2	3344	X		Consumed in use
Housing Maintenance	3351			
Interior Electric	2350	X	X	DPDO; consumed in use
Exterior Electric	1136	X		Consumed in use
Independent Electric	2175, 3455	X	X	DPDO, neutralization to sanitary sewer
Masonry Shop	2348			
343rd Supply Squadron				
Fuels Maintenance Lab	3242	X		
USAF Clinic				
Medical Radiology	3347	X		
Dental Radiology	3180	X		
Dental Clinic Lab	3180			
Medical Maintenance	2210	X		Consumed in use
Detachment 460				
Detachment 460 Lab	1183	X		Consumed in use
6985tn Electronic Security Squadron				
Electronic Maintenance	1138	X		Consumed in use
OL-A DET 5 1369th Audiovisual Squadron				
Cable Maintenance	2264	X	X	Silver recovery to sanitary sewer

[a]Information on the past locations of industrial shops was not available.

Appendix E--Continued

Name	Present Location[a] (Fac. No.)	Handles Hazardous Materials	Generates Hazardous Waste	Current Treatment/Storage/Disposal Methods
1995th Communications Squadron				
Cable Maintenance	3428			

[a]Information on the past locations of industrial shops was not available.



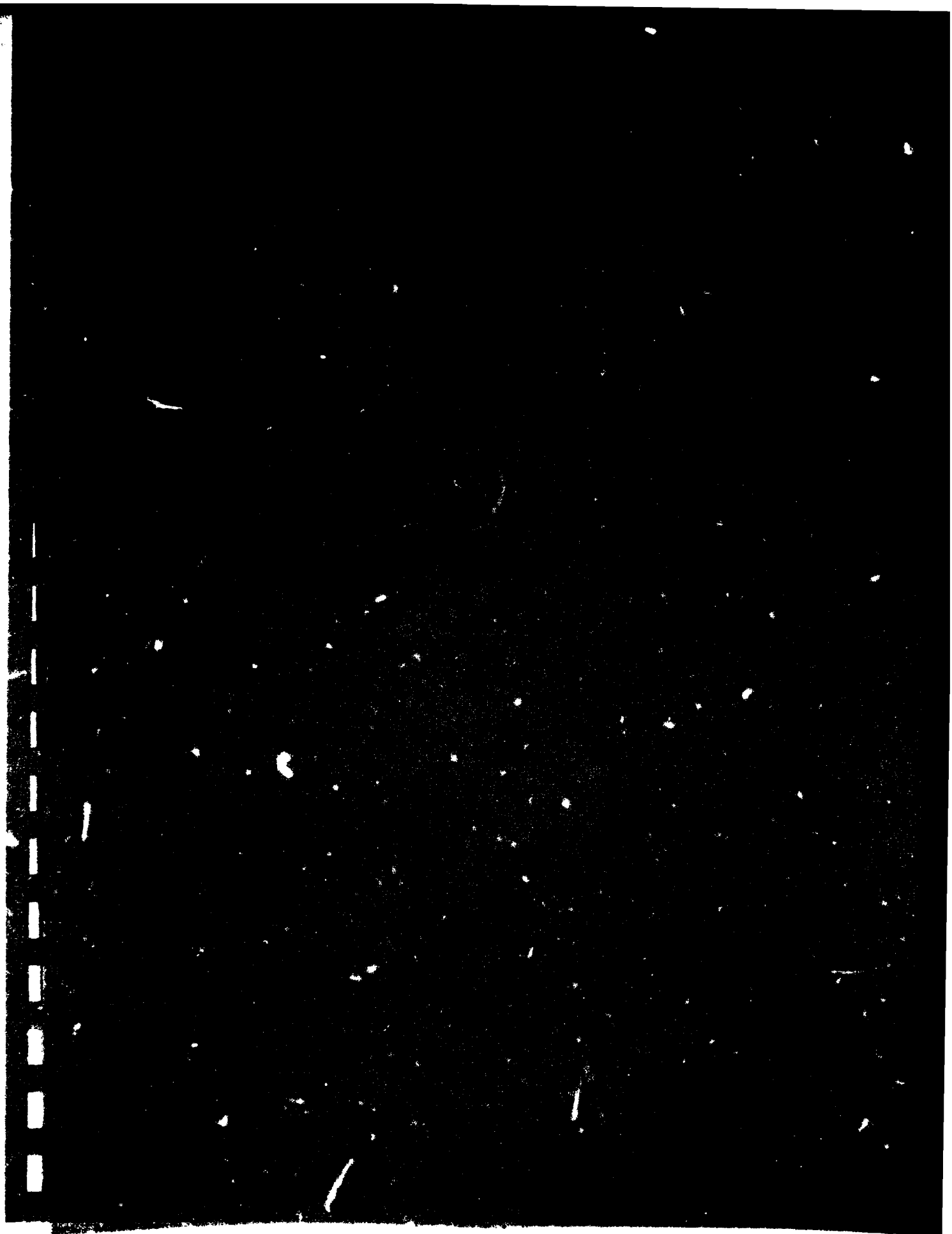
Appendix F
INVENTORY OF MAJOR EXISTING POL STORAGE TANKS

Facility No./Location	Type POL	Capacity	Tank Type
450	Diesel	3175 bbl	Unknown
1115	Diesel	1,600 gal	UG
1117	Diesel	1,000 gal	UG
1119	Diesel	1,000 gal	UG
1119	MOGAS	3,000 gal	UG
1140	Diesel	5,000 gal	Unknown
1146	Diesel	2,500 gal	Unknown
1181	Diesel	2,000 gal	Unknown
1240/E-4 Tank No. 23	Diesel	25,000 gal	UG
1240/E-4 Tank No. 24	JP-4	25,000 gal	UG
1240/E-4 Tank No. 25	JP-4	25,000 gal	UG
1240/E-4 Tank No. 26	JP-4	25,000 gal	UG
1240/E-4 Tank No. 27	JP-4	25,000 gal	UG
1240/E-4 Tank No. 28	JP-4	25,000 gal	UG
1240/E-4 Tank No. 29	JP-4	25,000 gal	UG
1240/E-4 Tank No. 30	JP-4	25,000 gal	UG
1240/E-4 Tank No. 31	JP-4	25,000 gal	UG
1240/E-4 Tank No. 32	JP-4	25,000 gal	UG
1259	Diesel	1,600 gal	Unknown
1300	Heating Fuel Oil	10,000 gal	UG
1300	Heating Fuel Oil	10,000 gal	UG
1302	Heating Fuel Oil	2,000 gal	UG
1303	Heating Fuel Oil	5,000 gal	UG
1305/E-9 Tank No. 49	JP-4	50,000 gal	AG
1305/E-9 Tank No. 50	JP-4	50,000 gal	AG
1305/E-9 Tank No. 51	JP-4	50,000 gal	AG
1305/E-9 Tank No. 52	JP-4	25,000 gal	AG
1307	Heating Fuel Oil	2,000 gal	UG
1311	Heating Fuel Oil	4,000 gal	UG
1315/E-7 Tank No. 41	JP-4	50,000 gal	AG
1315/E-7 Tank No. 42	JP-4	50,000 gal	AG
1315/E-7 Tank No. 43	JP-4	50,000 gal	AG

Facility No./Location	Type POL	Capacity	Tank Type
1315/E-7 Tank No. 44	JP-4	50,000 gal	AG
1315/E-8 Tank No. 45	JP-4	50,000 gal	AG
1315/E-8 Tank No. 46	JP-4	50,000 gal	AG
1315/E-8 Tank No. 47	JP-4	50,000 gal	AG
1315/E-8 Tank No. 48	JP-4	25,000 gal	AG
1339	Diesel	1,000 gal	Unknown
1481	Diesel	1,000 gal	Unknown
2316	Heating Fuel Oil	25,000 gal	Unknown
2339	Heating Fuel Oil	1,500 gal	Unknown
2375	MOGAS	10,000 gal	UG
2375	MOGAS	10,000 gal	UG
2375	MOGAS	10,000 gal	UG
3109	Diesel	5,000 gal	UG
3110	Diesel	2,500 gal	UG
3184/E-5 Tank No. 9	Diesel	25,000 gal	AG
3184/E-5 Tank No. 10	MOGAS	25,000 gal	AG
3184/E-5 Tank No. 11	MOGAS	25,000 gal	AG
3184/E-5 Tank No. 12	MOGAS	25,000 gal	AG
3351	Diesel	50,000 gal	AG
3354	MOGAS	10,000 gal	Unknown
3386	Special Liquid	262 bbl	Unknown
3413	Diesel	25,000 gal	UG
3413	Diesel	25,000 gal	UG
4368	JP-4	5,000 gal	Unknown
4368	MOGAS	5,000 gal	Unknown
4450	Special Liquid	523 bbl	Unknown
4480/E-10 Tank No. 33	JP-4	25,000 gal	AG
4480/E-10 Tank No. 34	Special Liquid	25,000 gal	AG
4480/E-10 Tank No. 300	JP-4	10,000 bbl	AG
6158	Heating Fuel Oil	30,000 gal	Unknown
6218	JP-4	25,000 gal	Unknown
6235/E-2 Tank No. 14	JP-4	16,000 bbl	AG
6236/E-2 Tank No. 15	JP-4	16,000 bbl	AG

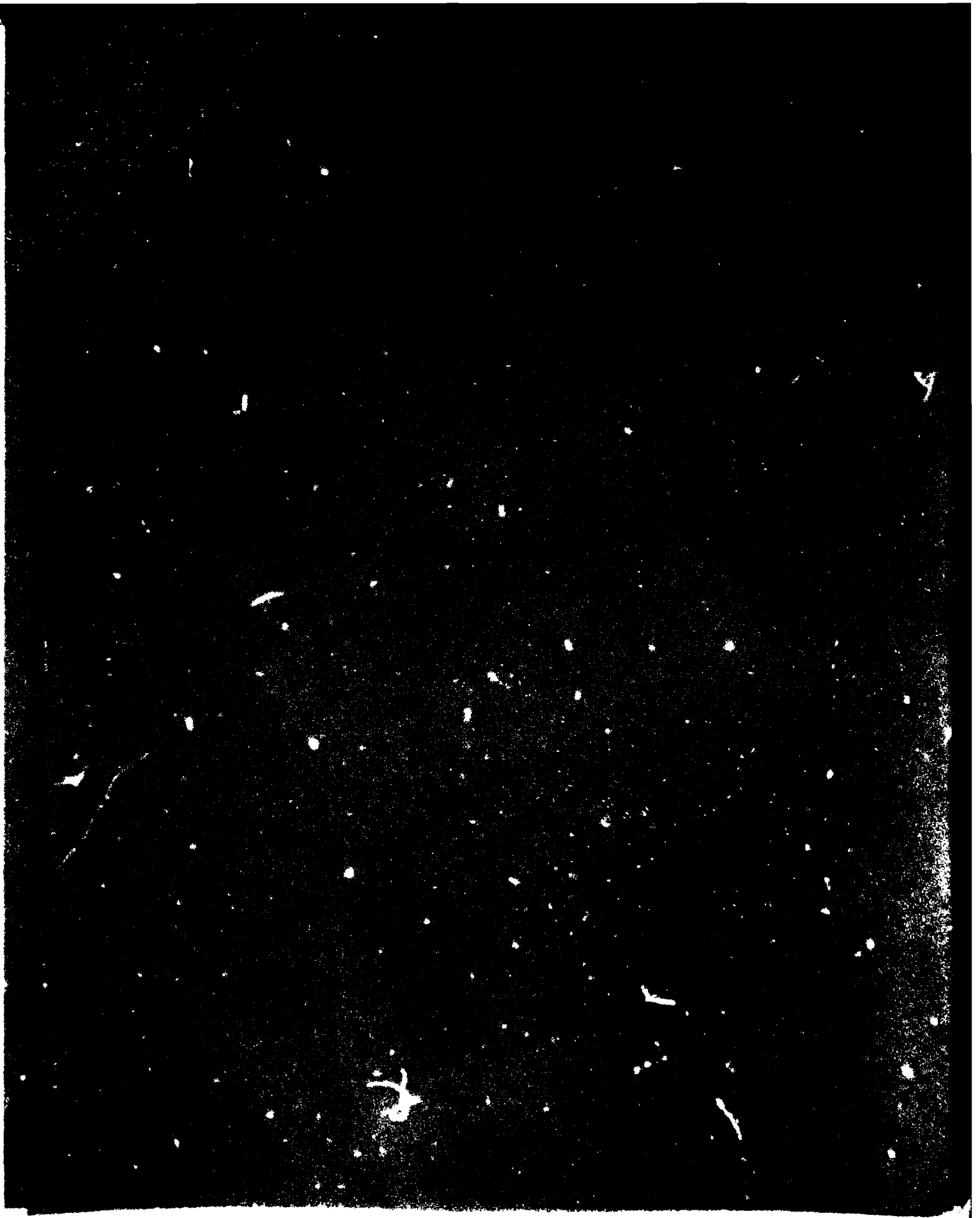
Facility No./Location	Type POL	Capacity	Tank Type
6238/E-2 Tank No. 16	JP-4	16,000 bbl	AG
6239/E-2 Tank No. 17	JP-4	16,000 bbl	AG
6240/E-2 Tank No. 20	JP-4	16,000 bbl	AG
6242/E-2 Tank No. 21	JP-4	16,000 bbl	AG
6246	AVGAS	1190 bbl	Unknown
6251/E-6 Tank No. 1	JP-7	5,000 bbl	AG
6251/E-6 Tank No. 2	JP-7	5,000 bbl	AG
6254/E-6 Tank No. 35	JP-7	30,000 bbl	AG
6255/E-6 Tank No. 36	JP-7	30,000 bbl	AG
6256/E-6 Tank No. 37	JP-7	30,000 bbl	AG
6257/E-6 Tank No. 38	JP-7	30,000 bbl	AG
6258/E-6 Tank No. 39	JP-7	30,000 bbl	AG
6259/E-6 Tank No. 40	JP-7	30,000 bbl	AG
6263/E-6 Tank No. 22	JP-7	100,000 bbl	AG
6261	JP-4	595 bbl	AG
6261	Miscellaneous	1,000 bbl	AG
6262	Special Liquid	5,000 bbl	AG
6378	Heating Fuel Oil	1,650 gal	Unknown
6380/E-11 Tank No. 57	JP-4	55,000 bbl	AG
6381/E-11 Tank No. 58	JP-4	55,000 bbl	AG
6382/E-11 Tank No. 59	JP-4	55,000 bbl	AG
6383/E-11 Tank No. 60	JP-4	55,000 bbl	AG
6384/E-11 Tank No. 61	JP-4	55,000 bbl	AG
6386/E-11 Tank No. 62	JP-4	25,000 bbl	AG

Notes: UG = Underground tank and AG = Aboveground tank.



Appendix G
INVENTORY OF OIL/WATER SEPARATORS

Location	Discharge
1120	Storm Drainage Ditch to Garrison Slough
1141	Sanitary Sewer
1152	Sanitary Sewer
1226	Sanitary Sewer
2171	Sanitary Sewer
2275	Sanitary Sewer
2351	Sanitary Sewer
2375	Sanitary Sewer
3213	Sanitary Sewer
3213	Sanitary Sewer
3219	Garrison Slough
3360	French Drain



USAF INSTALLATION RESTORATION PROGRAM
HAZARD ASSESSMENT RATING METHODOLOGY

BACKGROUND

The Department of Defense (DoD) has established a comprehensive program to identify, evaluate, and control problems associated with past disposal practices at DoD facilities. One of the actions required under this program is to:

> "develop and maintain a priority listing of contaminated installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts." (Reference: DEQPPM 81-5, 11 December 1981).

Accordingly, the United States Air Force (USAF) has sought to establish a system to set priorities for taking further actions at sites based upon information gathered during the Records Search phase of its Installation Restoration Program (IRP).

The first site rating model was developed in June 1981 at a meeting with representatives from USAF Occupational and Environmental Health Laboratory (OEHL), Air Force Engineering and Services Center (AFESC), Engineering-Science (ES) and CH2M HILL The basis for this model was a system developed for EPA by JRB Associates of McLean, Virginia. The JRB model was modified to meet Air Force needs.

After using this model for 6 months at over 20 Air Force installations, certain inadequacies became apparent. Therefore, on January 26 and 27, 1982, representatives of USAF OEHL, AFESC, various major commands, Engineering

Science, and CH2M HILL met to address the inadequacies. The result of the meeting was a new site rating model designed to present a better picture of the hazards posed by sites at Air Force installations. The new rating model described in this presentation is referred to as the Hazard Assessment Rating Methodology.

PURPOSE

The purpose of the site rating model is to provide a relative ranking of sites of suspected contamination from hazardous substances. This model will assist the Air Force in setting priorities for follow-on site investigations and confirmation work under Phase II of IRP.

This rating system is used only after it has been determined that (1) potential for contamination exists (hazardous wastes present in sufficient quantity), and (2) potential for migration exists. A site can be deleted from consideration for rating on either basis.

DESCRIPTION OF MODEL

Like the other hazardous waste site ranking models, the U.S. Air Force's site rating model uses a scoring system to rank sites for priority attention. However, in developing this model, the designers incorporated some special features to meet specific DoD program needs.

The model uses data readily obtained during the Record Search portion (Phase I) of the IRP. Scoring judgments and computations are easily made. In assessing the hazards at a given site, the model develops a score based on the most likely routes of contamination and the worst hazards at the site. Sites are given low scores only if there are clearly no hazards at the site. This approach meshes well with the

policy for evaluating and setting restrictions on excess DoD properties.

Site scores are developed using the appropriate ranking factors according to the method presented in the flow chart (Figure 1). The site rating form is provided in Figure 2 and the rating factor quidelines are provided in Table 1.

As with the previous model, this model considers four aspects of the hazard posed by a specific site: the possible receptors of the contamination, the waste and its characteristics, the potential pathways for waste contaminant migration, and any efforts to contain the contamination. Each of these categories contains a number of rating factors that are used in the overall hazard rating.

The receptors category rating is calculated by scoring each factor, multiplying by a factor weighting constant, and adding the weighted scores to obtain a total category score.

The pathways category rating is based on evidence of contaminant migration or an evaluation of the highest potential (worst case) for contaminant migration along one of three pathways. If evidence of contaminant migration exists, the category is given a subscore of 80 to 100 points. For indirect evidence, 80 points are assigned and for direct evidence 100 points are assigned. If no evidence is found, the highest score among three possible routes is used. These routes are surface-water migration, flooding, and ground-water migration. Evaluation of each route involves factors associated with the particular migration route. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The waste characteristics category is scored in three steps. First, a point rating is assigned based on an assessment of the waste quantity and the hazard (worst case) associated with the site. The level of confidence in the information is also factored into the assessment. Next, the score is multiplied by a waste persistence factor, which acts to reduce the score if the waste is not very persistent. Finally, the score is further modified by the physical state of the waste. Liquid wastes receive the maximum score, while scores for sludges and solids are reduced.

The scores for each of the three categories are then added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Sites at which there is no containment are not reduced in score. Scores for sites with limited containment can be reduced by 5 percent. If a site is contained and well managed, its score can be reduced by 90 percent. The final site score is calculated by applying the waste management practices category factor to the sum of the scores for the other three categories.

HAZARD ASSESSMENT RATING METHODOLOGY FLOW CHART

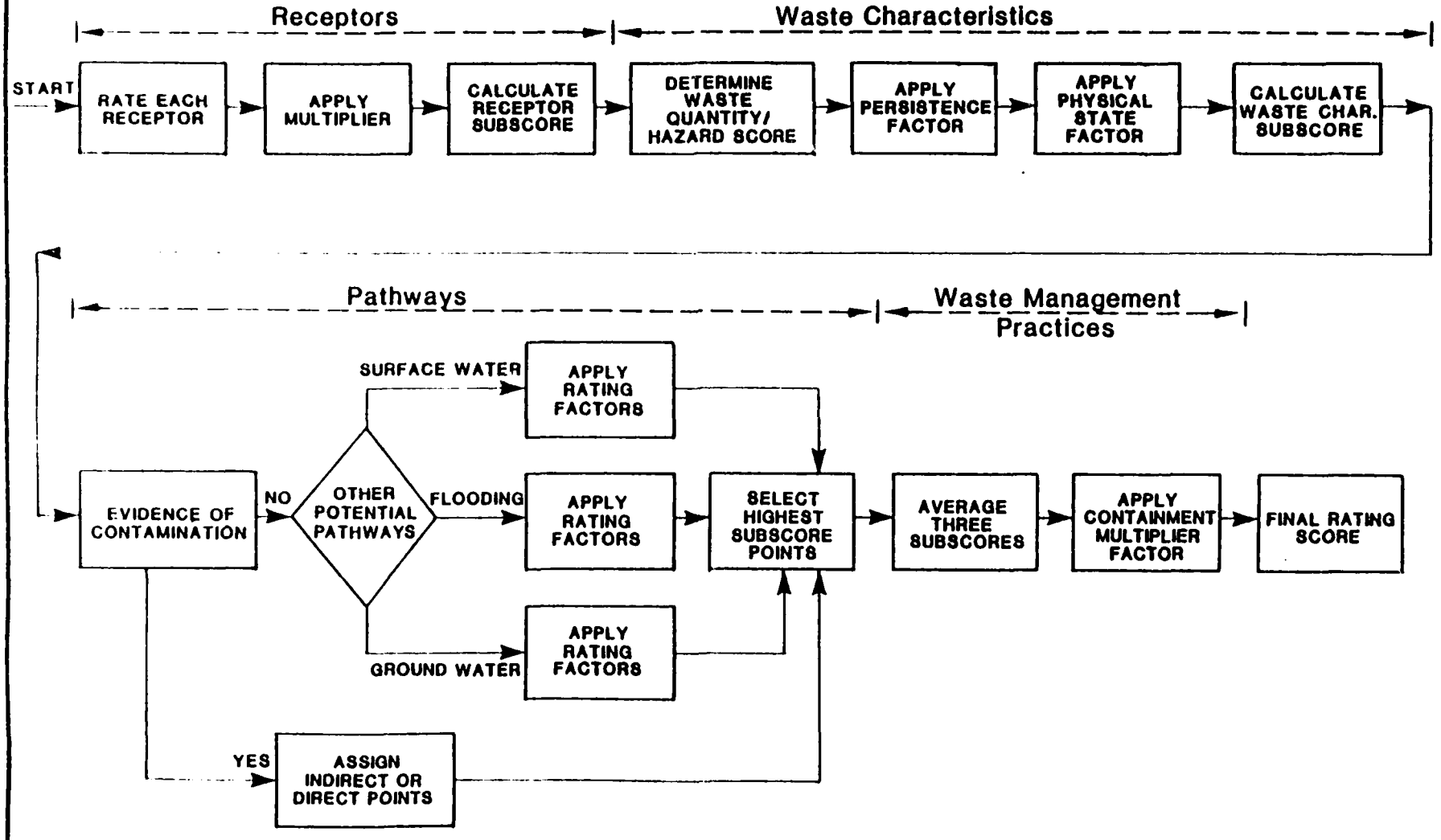


FIGURE 1

FIGURE 2

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE _____

LOCATION _____

DATE OF OPERATION OR OCCURRENCE _____

OWNER/OPERATOR _____

COMMENTS/DESCRIPTION _____

SITE RATED BY _____

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site		4		
B. Distance to nearest well		10		
C. Land use/zoning within 1 mile radius		3		
D. Distance to reservation boundary		6		
E. Critical environments within 1 mile radius of site		10		
F. Water quality of nearest surface water body		6		
G. Ground water use of uppermost aquifer		9		
H. Population served by surface water supply within 3 miles downstream of site		6		
I. Population served by ground-water supply within 3 miles of site		6		

Subtotals _____ _____

Receptors subscore (100 X factor score subtotal/maximum score subtotal) _____

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) _____
2. Confidence level (C = confirmed, S = suspected) _____
3. Hazard rating (H = high, M = medium, L = low) _____

Factor Subscore A (from 20 to 100 based on factor score matrix) _____

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

_____ X _____ = _____

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

_____ X _____ = _____

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore _____

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water		8		
Net precipitation		6		
Surface erosion		8		
Surface permeability		6		
Rainfall intensity		8		
		Subtotals	_____	_____

Subscore (100 X factor score subtotal/maximum score subtotal) _____

2. Flooding

Flooding		1		

Subscore (100 x factor score/3) _____

3. Ground-water migration

Depth to ground water		8		
Net precipitation		6		
Soil permeability		8		
Subsurface flows		8		
Direct access to ground water		8		
		Subtotals	_____	_____

Subscore (100 x factor score subtotal/maximum score subtotal) _____

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore _____

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors _____
Waste Characteristics _____
Pathways _____

Total _____ divided by 3 = _____
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

_____ X _____ = [ ]

TABLE 1

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES

I. RECEPTORS CATEGORY

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
A. Population within 1,000 feet (includes on-base facilities)	0	1 - 25	26 - 100	Greater than 100	4
B. Distance to nearest water well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet	10
C. Distance to installation boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet	3
D. Land Use/Zoning (within 1 mile radius)	Completely remote (zoning not applicable)	Agricultural	Commercial or industrial	Residential	6
E. Critical environments (within 1 mile radius)	Not a critical environment	Natural areas	Pristine natural areas; minor wetlands; preserved areas; presence of economically important natural resources susceptible to contamination.	Major habitat of an endangered or threatened species; presence of recharge area; major wetlands.	10
F. Water quality/use designation of nearest surface water body	Agricultural or industrial use.	Recreation, propagation and management of fish and wildlife.	Shellfish propagation and harvesting.	Potable water supplies	6
G. Ground-Water use of uppermost aquifer	Not used, other sources readily available.	Commercial, industrial, or irrigation, very limited other water sources.	Drinking water, municipal water available.	Drinking water, no municipal water available; commercial, industrial, or irrigation, no other water source available.	9
H. Population served by surface water supplies within 3 miles downstream of site	0	1 - 50	51 - 1,000	Greater than 1,000	6
I. Population served by aquifer supplies within 3 miles of site	0	1 - 50	51 - 1,000	Greater than 1, 000	6

TABLE 1 (Continued)

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES (Cont'd)

II. WASTE CHARACTERISTICS

A-1 Hazardous Waste Quantity

S = Small quantity (5 tons or 20 drums of liquid)
M = Moderate quantity (5 to 20 tons or 21 to 85 drums of liquid)
L = Large quantity (20 tons or 85 drums of liquid)

A-2 Confidence Level of Information

C = Confirmed confidence level (minimum criteria below)

- o Verbal reports from interviewer (at least 2) or written information from the records.
- o Knowledge of types and quantities of wastes generated by shops and other areas on base.
- o Based on the above, a determination of the types and quantities of waste disposed of at the site.

S = Suspected confidence level

- o No verbal reports or conflicting verbal reports and no written information from the records.
- o Logic based on a knowledge of the types and quantities of hazardous wastes generated at the base, and a history of past waste disposal practices indicate that these wastes were disposed of at a site.

A-3 Hazard Rating

Hazard Category	Rating Scale Levels			
	0	1	2	3
Toxicity	Sax's Level 0	Sax's Level 1	Sax's Level 2	Sax's Level 3
Ignitability	Flash point greater than 200°F	Flash point at 140°F to 200°F	Flash point at 80°F to 140°F	Flash point less than 80°F
Radioactivity	At or below background levels	1 to 3 times background levels	3 to 5 times background levels	Over 5 times background levels

Use the highest individual rating based on toxicity, ignitability and radioactivity and determine the hazard rating.

Hazard Rating	Points
High (H)	3
Medium (M)	2
Low (L)	1

TABLE 1 (Continued)

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES (Cont'd)

II. WASTE CHARACTERISTICS (Continued)

Waste Characteristics Matrix

Point Rating	Hazardous Waste Quantity	Confidence Level of Information	Hazard Rating
100	L	C	H
80	L	C	M
	M	C	H
70	L	S	H
60	S	C	H
	M	C	M
50	L	S	M
	L	C	L
	M	S	H
	S	C	M
40	S	S	H
	M	S	M
	M	C	L
	L	S	L
30	S	C	L
	M	S	L
	S	S	M
20	S	S	L

Notes:
For a site with more than one hazardous waste, the waste quantities may be added using the following rules:
Confidence Level
- o Confirmed confidence levels (C) can be added
- o Suspected confidence levels (S) can be added
- o Confirmed confidence levels cannot be added with suspected confidence levels

Waste Hazard Rating
- o Wastes with the same hazard rating can be added
- o Wastes with different hazard ratings can only be added in a downgrade mode, e.g., MCM + SCH = LCM if the total quantity is greater than 20 tons.

Example: Several wastes may be present at a site, each having an MCM designation (60 points). By adding the quantities of each waste, the designation may change to LCM (80 points). In this case, the correct point rating for the waste is 80.

B. Persistence Multiplier for Point Rating

Persistence Criteria	Multiply Point Rating From Part A by the Following
Metals, polycyclic compounds, and halogenated hydrocarbons	1.0
Substituted and other ring compounds	0.9
Straight chain hydrocarbons	0.8
Easily biodegradable compounds	0.4

C. Physical State Multiplier

Physical State	Multiply Point Total From Parts A and B by the Following
Liquid	1.0
Sludge	0.75
Solid	0.50

TABLE 1 (Continued)

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES (Cont'd)

III. PATHWAYS CATEGORY

A. Evidence of Contamination

Direct evidence is obtained from laboratory analyses of hazardous contaminants present above natural background levels in surface water, ground water, or air. Evidence should confirm that the source of contamination is the site being evaluated.

Indirect evidence might be from visual observation (i.e., leachate), vegetation stress, sludge deposits, presence of taste and odors in drinking water, or reported discharges that cannot be directly confirmed as resulting from the site, but the site is greatly suspected of being a source of contamination.

B-1 POTENTIAL FOR SURFACE WATER CONTAMINATION

Rating Factor	Rating Scale Levels 0	1	2	3	Multiplier
Distance to nearest surface water (includes drainage ditches and storm sewers)	Greater than 1 mile	2,001 feet to 1 mile	501 feet to 2,000 feet	0 to 500 feet	8
Net precipitation	*Less than -10 in.*	-10 to + 5 in.	+5 to +20 in.	Greater than +20 in.	6
Surface erosion	None	Slight	Moderate	Severe	8
Surface permeability	0% to 15% clay ($>10^{-2}$ cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	Greater than 50% clay ($<10^{-6}$ cm/sec)	6
Rainfall intensity based on 1 year 24-hr rainfall	<1.0 inch	1.0-2.0 inches	2.1-3.0 inches	>3.0 inches	8
B-2 POTENTIAL FOR FLOODING					
Floodplain	Beyond 100-year floodplain	In 25-year floodplain	In 10-year floodplain	Floods annually	1
B-3 POTENTIAL FOR GROUND-WATER CONTAMINATION					
Depth to ground water	Greater than 500 ft	50 to 500 feet	11 to 50 feet	0 to 10 feet	8
Net precipitation	Less than -10 in.	-10 to +5 in.	+5 to +20 in.	Greater than +20 in.	6
Soil permeability	Greater than 50% clay ($>10^{-6}$ cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	0% to 15% clay ($<10^{-2}$ cm/sec)	8
Subsurface flows	Bottom of site greater than 5 feet above high ground-water level	Bottom of site occasionally submerged	Bottom of site frequently submerged	Bottom of site located below mean ground-water level	8
Direct access to ground water (through faults, fractures, faulty well [illegible] ings, [illegible] fissures, etc.)	No evidence of risk	Low risk	Moderate risk	High risk	8

TABLE 1 (Continued)

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES (Cont'd)

IV. WASTE MANAGEMENT PRACTICES CATEGORY

A. This category adjusts the total risk as determined from the receptors, pathways, and waste characteristics categories for waste management practices and engineering controls designed to reduce this risk. The total risk is determined by first averaging the receptors, pathways, and waste characteristics subscores.

B. WASTE MANAGEMENT PRACTICES FACTOR

The following multipliers are then applied to the total risk points (from A):

Waste Management Practice	Multiplier
No containment	1.0
Limited containment	0.95
Fully contained and in full compliance	0.10

Guidelines for fully contained:

Landfills:

- o Clay cap or other impermeable cover
- o Leachate collection system
- o Liners in good condition
- o Adequate monitoring wells

Spills:

- o Quick spill cleanup action taken
- o Contaminated soil removed
- o Soil and/or water samples confirm total cleanup of the spill

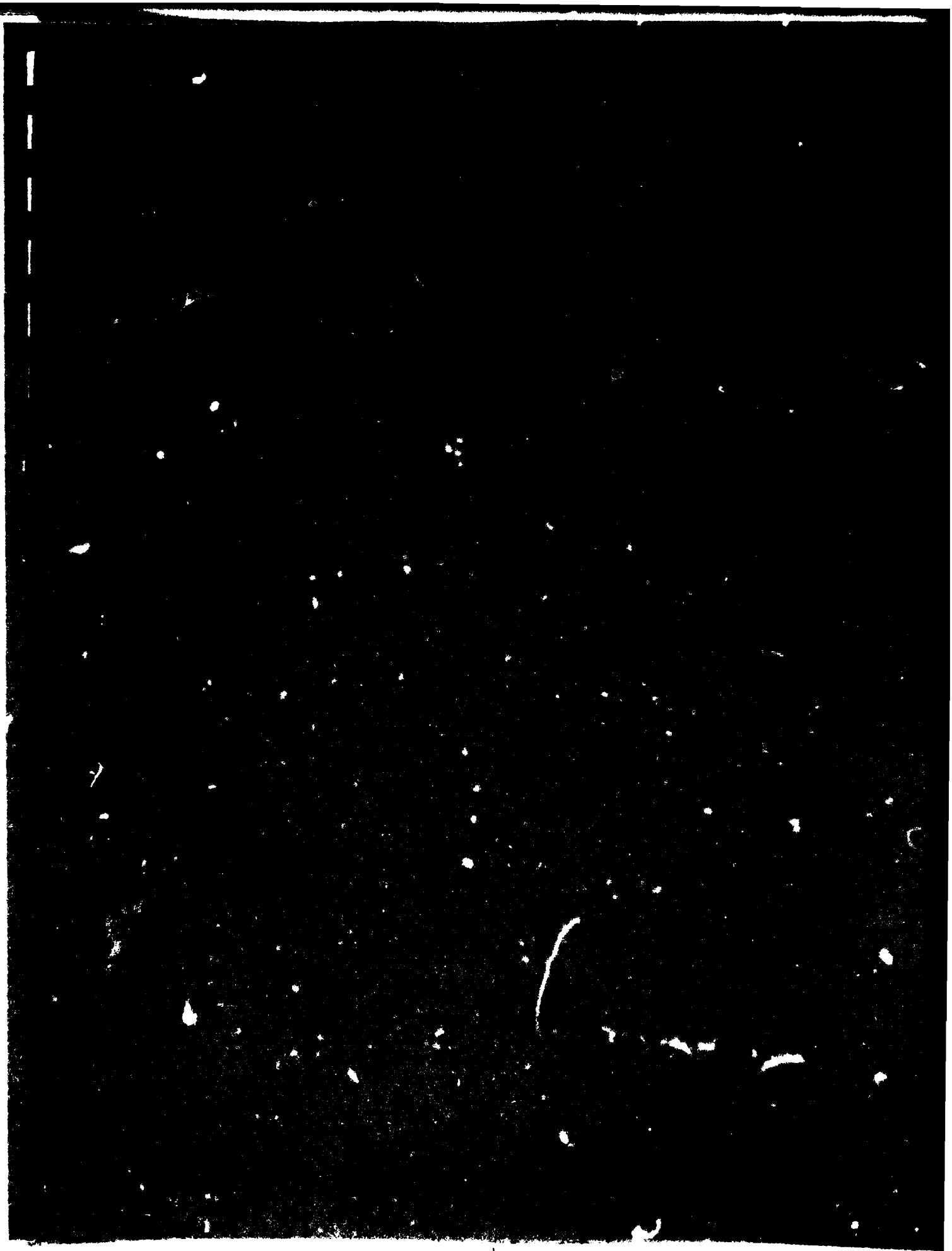
Surface Impoundments:

- o Liners in good condition
- o Sound dikes and adequate freeboard
- o Adequate monitoring wells

Fire Proection Training Areas:

- o Concrete surface and berms
- o Oil/water separator for pretreatment of runoff
- o Effluent from oil/water separator to treatment plant

General Note: If data are not available or known to be complete the factor ratings under items I-A through I, III-B-1 or III-B-3, then leave blank for calculation of factor score and maximum possible score.



HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 1, Original Base Landfill

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1950 to 1960

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Main base landfill

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	89	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 49

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 70

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

70 x 1.0 = 70

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

70 x 1.0 = 70

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	NA	8	--	--
		Subtotals	62	90
Subscore (100 x factor score subtotal/maximum score subtotal)				69
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	69

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	49
Waste Characteristics	70
Pathways	69
Total 188 divided by 3 =	63
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

63 x 1.0 = 63

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 2, Old Base Landfill

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1960 to 1967

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Main base landfill

SITE RATED BY: Greg McIntyre

I. RECEPTORS

Rating Factor		Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	92	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 51

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 70

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

70 x 1.0 = 70

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

70 x 1.0 = 70

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8		24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	NA	8	--	--
		Subtotals	62	90
Subscore (100 x factor score subtotal/maximum score subtotal)				69
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		69

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	51
Waste Characteristics	70
Pathways	69
Total 190 divided by 3 =	63
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

63 x 1.0 = 63

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 3, Current Base Landfill

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1967 to present

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Main base landfill, fire department training 1955 to 1976

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	90	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 50

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

100 x 1.0 = 100

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

100 x 1.0 = 100

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	NA	8	--	--
		Subtotals	62	90
Subscore (100 x factor score subtotal/maximum score subtotal)				69
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	69

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	50
Waste Characteristics	100
Pathways	69
Total 219 divided by 3 =	73
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

3 x 1.0	73

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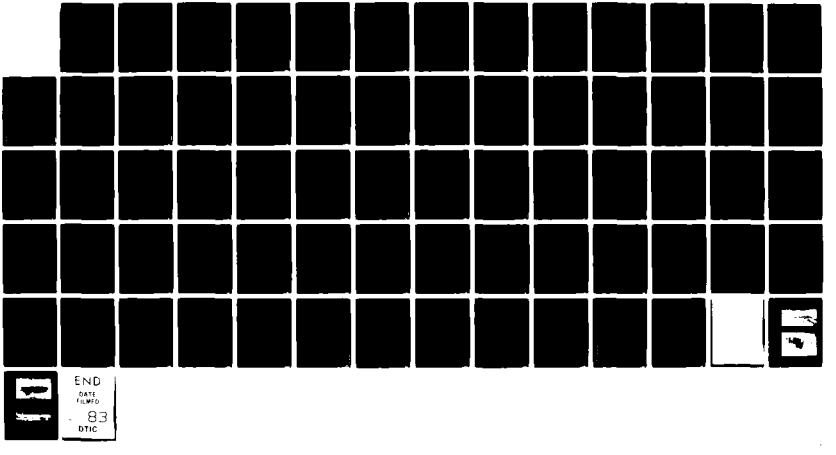

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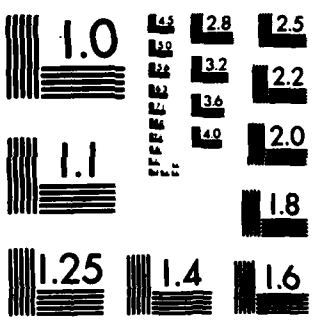

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 4, Old Army Landfill and Current EOD Area

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: Landfill 1956 to 1959, EOD 1960s to present

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Landfill used by army battery, EOD area

SITE RATED BY: Greg McIntyre

I. RECEPTORS

Rating Factor		Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	1	10	10	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	73	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 41

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	1	8	8	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	22	108
Subscore (100 x factor score subtotal/maximum score subtotal)				20
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	41
Waste Characteristics	40
Pathways	60
Total 141 divided by 3 =	47
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

47 x 1.0 = 47

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 5, Old Army Landfill

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1956 to 1959

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Landfill used by army battery

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	83	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 46

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	30	108
Subscore (100 x factor score subtotal/maximum score subtotal)				28
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	46
Waste Characteristics	40
Pathways	60
Total 146 divided by 3 =	49
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

49 x 1.0 = 49

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 6, Old Landfill

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1959 to 1963

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Small base landfill

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surfa -water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Populati. served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	94	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	1	8	8	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	22	108
Subscore (100 x factor score subtotal/maximum score subtotal)				20
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	40
Pathways	60
Total 152 divided by 3 =	51
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

51 x 1.0 = 51

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 8, Original Fire Department Training Area

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1948 to 1955

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Fire department training exercises conducted

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	99	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 55

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 0.8 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	3	8	24	24
Direct access to ground water	NA	8	--	--
		Subtotals	78	90
Subscore (100 x factor score subtotal/maximum score subtotal)				87
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	87

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	55
Waste Characteristics	40
Pathways	87
Total 182 divided by 3 =	61
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

61 x 1.0 = 61

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 9, Current Fire Department Training Area

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1976 to present

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Fire department training exercises conducted

SITE RATED BY: Greg McIntyre

I. RECEPTORS

Rating Factor		Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	94	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

100 x 0.8 = 80

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	80
Pathways	60
Total 192 divided by 3 =	64
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

64 x 1.0 = 64

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 10, POL Lake and E-2 POL Storage Area

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: Spill in 1967, Leaking Tanks in 1978

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Floating hydrocarbon layer on lake

SITE RATED BY: Greg McIntyre

I. RECEPTORS

Rating Factor		Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	[illegible]	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1		6	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	104	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 58

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

100 x 0.8 = 80

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

100 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	NA	1	--	--
		Subscore (100 x factor score/3)		--
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	58
Waste Characteristics	80
Pathways	80
Total 218 divided by 3 =	73
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

73 x 1.0 = 73

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 11, Fuel-Saturated Area

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Hydrocarbon layer floating on water table

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	104	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 58

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.8 = 64

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	100
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	2	8	16	24
Direct access to ground water	NA	8	--	--
		Subtotals	70	90
Subscore (100 x factor score subtotal/maximum score subtotal)				78
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	100

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	58
Waste Characteristics	64
Pathways	100
Total 222 divided by 3 =	74
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

74 x 0.95 = 70

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 13, E-4-1/2 Diesel Fuel Spill Area

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: Periodic Spills from 1960s to Present

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Numerous spills of fuel bladders

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	100	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 56

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.8 = 64

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	56
Waste Characteristics	64
Pathways	60
Total 180 divided by 3 =	60
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

60 x 1.0 = 60

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 14, E-2, Railroad JP-4 Fuel Spill Area

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1950s to 1977

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Periodic spills during railroad delivery

SITE RATED BY: Greg McIntyre

I. RECEPTORS

Rating Factor		Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	94	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 0.8 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	40
Pathways	60
Total 152 divided by 3 =	51
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

51 x 1.0 = 51

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 15, Multiproduct Fuel Line Spill

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: Two spills, 1970 and 1973

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: JP-4 and MOGAS spills, evidence of vegetative stress

SITE RATED BY: Greg McIntyre

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	12
B. Distance to nearest well	1	10	10	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface-water body	1	6	6	18
G. Ground-water use of uppermost aquifer	3	9	27	27
H. Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	93	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.8 = 64

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	30	108
Subscore (100 x factor score subtotal/maximum score subtotal)				28
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	64
Pathways	80
Total 196 divided by 3 =	65
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

65 x 1.0 = 65

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 16, MOGAS Fuel Line Spill

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1957

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Near Facility No. 6214

SITE RATED BY: Greg McIntyre

I. RECEPTORS

Rating Factor		Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	94	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 70

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

70 x 0.8 = 56

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

56 x 1.0 = 56

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	30	108
Subscore (100 x factor score subtotal/maximum score subtotal)				28
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	56
Pathways	60
Total 168 divided by 3 =	56
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

56 x 1.0 = 56

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 17, Canol Pipeline Spill

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1957

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Pipeline rupture, unknown fuel

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	100	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 56

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 70

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

70 x 0.8 = 56

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

56 x 1.0 = 56

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	56
Waste Characteristics	56
Pathways	60
Total 172 divided by 3 =	57
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

57 x 1.0 = 57

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 18, Fuel-Saturated Area, Old Boiler Plant

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Known hydrocarbon layer floating on water table

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	94	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 70

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

70 x 0.8 = 56

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

56 x 1.0 = 56

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	2	8	16	24
Direct access to ground water	NA	8	--	--
		Subtotals	70	90
Subscore (100 x factor score subtotal/maximum score subtotal)				78
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	56
Pathways	80
Total 188 divided by 3 =	63
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

63 x 1.0 = 63

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 19, JP-4 Fuel Line Spill

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1955

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Evidence of vegetative stress

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	100	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 56

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.8 = 64

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	30	108
Subscore (100 x factor score subtotal/maximum score subtotal)				28
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	56
Waste Characteristics	64
Pathways	80
Total 200 divided by 3 =	67
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

67 x 1.0 = 67

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 20, Refueling Loop Fuel-Saturated Area

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Known hydrocarbon layer floating on water table

SITE RATED BY: Greg McIntyre

I. RECEPTORS

Rating Factor		Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	87	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 48

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 70

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

70 x 0.8 = 56

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

56 x 1.0 = 56

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	30	108
Subscore (100 x factor score subtotal/maximum score subtotal)				28
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	2	8	16	24
Direct access to ground water	NA	8	--	--
		Subtotals	70	90
Subscore (100 x factor score subtotal/maximum score subtotal)				78
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	48
Waste Characteristics	56
Pathways	80
Total 184 divided by 3 =	61
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

61 x 1.0 = 61

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 21, Road Oiling--Quarry Road

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1948 to present

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Road oiling during summer

SITE RATED BY: Greg McIntyre

I. RECEPTORS

Rating Factor		Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	100	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 56

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	56
Waste Characteristics	40
Pathways	60
Total 156 divided by 3 =	52
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

52 x 1.0 = 52

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 22, Road Oiling--Industrial Drive

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1948 to present

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Road oiling during summer

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	102	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 57

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	30	108
Subscore (100 x factor score subtotal/maximum score subtotal)				28
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	57
Waste Characteristics	40
Pathways	60
Total 157 divided by 3 =	52
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

52 x 1.0 = 52

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 23, Road Oiling--Manchu Road

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1948 to present

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Road oiling during the summer

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	98	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 54

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				30
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	54
Waste Characteristics	40
Pathways	60
Total 154 divided by 3 =	51
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

51 x 1.0 = 51

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 24, Road Oiling--Gravel Haul Road

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1948 to present

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Road oiling during summer

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	2	6	16	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	104	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 58

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	4	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	58
Waste Characteristics	40
Pathways	60
Total 158 divided by 3 =	53
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

53 x 1.0 = 53

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 25, Fuel Tank Sludge Burial Site, E-6

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1955 to 1980

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Periodic sludge weathering; potential for leaded AVGAS

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	100	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 56

II. WASTE CHARACTERISTICS

A Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 0.75 38

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	1	8	8	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	22	108
Subscore (100 x factor score subtotal/maximum score subtotal)				20
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	56
Waste Characteristics	38
Pathways	60
Total 154 divided by 3 =	51
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

51 x 1.0 = 51

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 26, E-10 Fuel Tank Sludge Burial Site

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1964 to 1980

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Periodic sludge weathering; potential for leaded AVGAS

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	94	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 0.75 = 38

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	38
Pathways	60
Total 150 divided by 3 =	50
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

50 x 1.0 = 50

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 27, Fuel Tank Sludge Burial Site, E-11

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1955 to 1980

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Periodic sludge weathering, potential for leaded AVGAS

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	100	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 56

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 0.75 = 38

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	1	8	8	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	22	108
Subscore (100 x factor score subtotal/maximum score subtotal)				20
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	56
Waste Characteristics	38
Pathways	60
Total 154 divided by 3 =	51
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

51 x 1.0 = 51

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 29, Drum Burial Site

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1965 to 1968

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Burial of empty drums, some residual

SITE RATED BY: Greg McIntyre

I. RECEPTORS

Rating Factor		Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	93	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	30	108
Subscore (100 x factor score subtotal/maximum score subtotal)				28
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	NA	8	--	--
		Subtotals	62	90
Subscore (100 x factor score subtotal/maximum score subtotal)				69
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		69

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	40
Pathways	69
Total 161 divided by 3 =	54
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

54 x 1.0 = 54

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 32, Sewage Treatment Plant Spill Ponds

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: Intermittent use 1970 to present

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Diversion of POL and other slugs to spill ponds

SITE RATED BY: Greg McIntyre

I. RECEPTORS

Rating Factor		Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	97	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 54

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 1.0 = 80

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	54
Waste Characteristics	80
Pathways	60
Total 194 divided by 3 =	65
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

65 x 1.0 = 65

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 34, Sewage Treatment Sludge Drying Beds

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1953 to present

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Two locations, no leachate collection

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	97	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 54

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 0.75 = 30

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	-
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	54
Waste Characteristics	30
Pathways	60
Total 144 divided by 3 =	48
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

48 x 1.0 = 48

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 35, Asphalt Mixing Area, Asphalt Drum Disposal

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1950s to 1960s

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Asphalt mixing operation, empty drum disposal

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	104	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 58

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x 0.8 = 48

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

48 x 1.0 = 48

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	58
Waste Characteristics	48
Pathways	60
Total 166 divided by 3 =	55
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

55 x 1.0 = 55

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 36, Drum Storage Site and Asphalt Mixing Area

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: Late 1960s to 1970s

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Empty and full drum storage; asphalt mixing area; pool of POL on ground

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	94	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x 0.8 = 48

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

48 x 1.0 = 48

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	30	108
Subscore (100 x factor score subtotal/maximum score subtotal)				28
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	4	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	48
Pathways	80
Total 180 divided by 3 =	60
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

60 x 1.0 = 60

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 37, Drum Storage Site and Asphalt Mixing Area

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1970s to present

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Pool of POL on ground; empty and full drum storage

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	94	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x 0.8 = 48

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

48 x 1.0 = 48

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	48
Pathways	80
Total 180 divided by 3 =	60
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

60 x 1.0 = 60

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 38, Waste POL Pit

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: Late 1950s to 1970

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Pit received fuel tank sludge and contaminated fuels

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	93	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.8 = 64

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	0	8	0	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	14	108
Subscore (100 x factor score subtotal/maximum score subtotal)				13
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	64
Pathways	60
Total 176 divided by 3 =	59
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

59 x 0.95 = 56

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 39, Asphalt Lake

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: Drums of liquid asphalt material left in 1948

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Over 500 leaking drums of asphalt materials

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	1	10	10	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	79	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 44

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.8 = 64

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	1	8	8	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	22	108
Subscore (100 x factor score subtotal/maximum score subtotal)				20
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	44
Waste Characteristics	64
Pathways	80
Total 188 divided by 3 =	63
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

63 x 1.0 = 63

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 41, Auto Hobby Shop

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1960s to 1982

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Oil-saturated ground surface

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	94	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x 0.8 = 48

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

48 x 1.0 = 48

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	30	108
Subscore (100 x factor score subtotal/maximum score subtotal)				28
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		80

IV. WASTE MANAGEMENT PRACTICES

A. *Average the three subscores for receptors, waste characteristics, and pathways.*

Receptors	52
Waste Characteristics	48
Pathways	80
Total 180 divided by 3 =	60
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

60 x 1.0 = 60

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Site No. 42, Miscellaneous Storage/Disposal Area

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: 1960s

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Disposal of empty drums

SITE RATED BY: Greg McIntyre

I. RECEPTORS

Rating Factor		Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	93	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	30	108
Subscore (100 x factor score subtotal/maximum score subtotal)				28
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	54	90
Subscore (100 x factor score subtotal/maximum score subtotal)				60
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	60

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	40
Pathways	60
Total 152 divided by 3 =	51
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

51 x 1.0 = 51

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Potential Fuel-Saturated Area of Base (Composite Site includes Sites No. 11, 19, 15, 18, 20, 13, 41, 36, 37, 17, 16, and 14)

LOCATION: Eielson AFB

DATE OF OPERATION OR OCCURRENCE: Refer to individual rating forms

OWNER/OPERATOR: Eielson AFB

COMMENTS/DESCRIPTION: Composite Site of 12 fuel spill-related sites

SITE RATED BY: Greg McIntyre

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	116	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 64

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

100 x 0.8 = 80

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	1	6	6	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	1	6	6	18
Soil permeability	3	8	24	24
Subsurface flows	2	8	16	24
Direct access to ground water	NA	8	--	--
		Subtotals	70	90
Subscore (100 x factor score subtotal/maximum score subtotal)				78
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	64
Waste Characteristics	80
Pathways	80
Total 224 divided by 3 =	75
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

75 x 1.0 = 75

[redacted]

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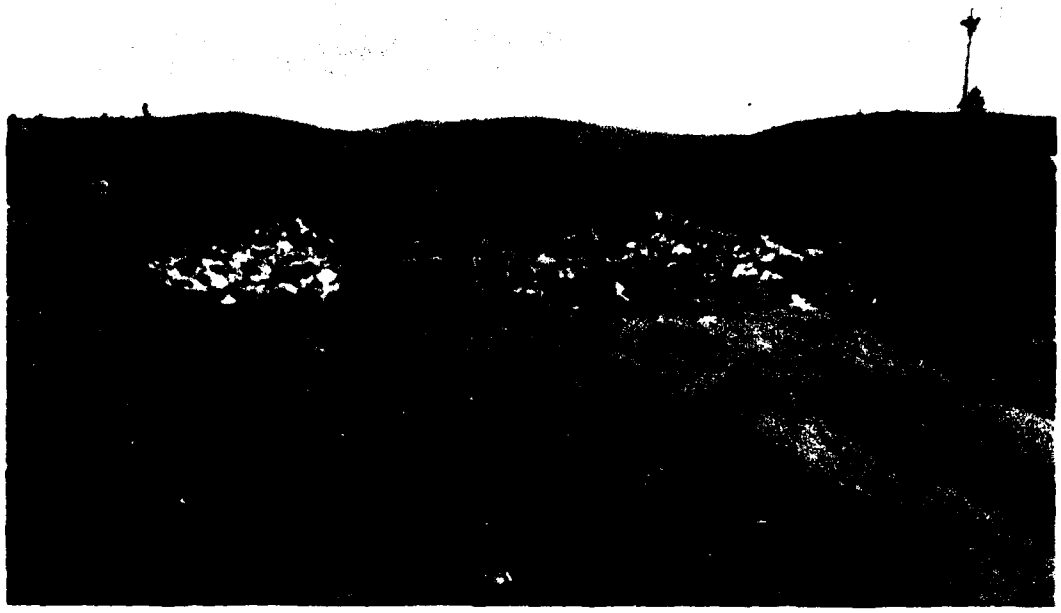

FIGURE J-1. Site No. 3—Current base landfill. This landfill has been in operation since 1967.

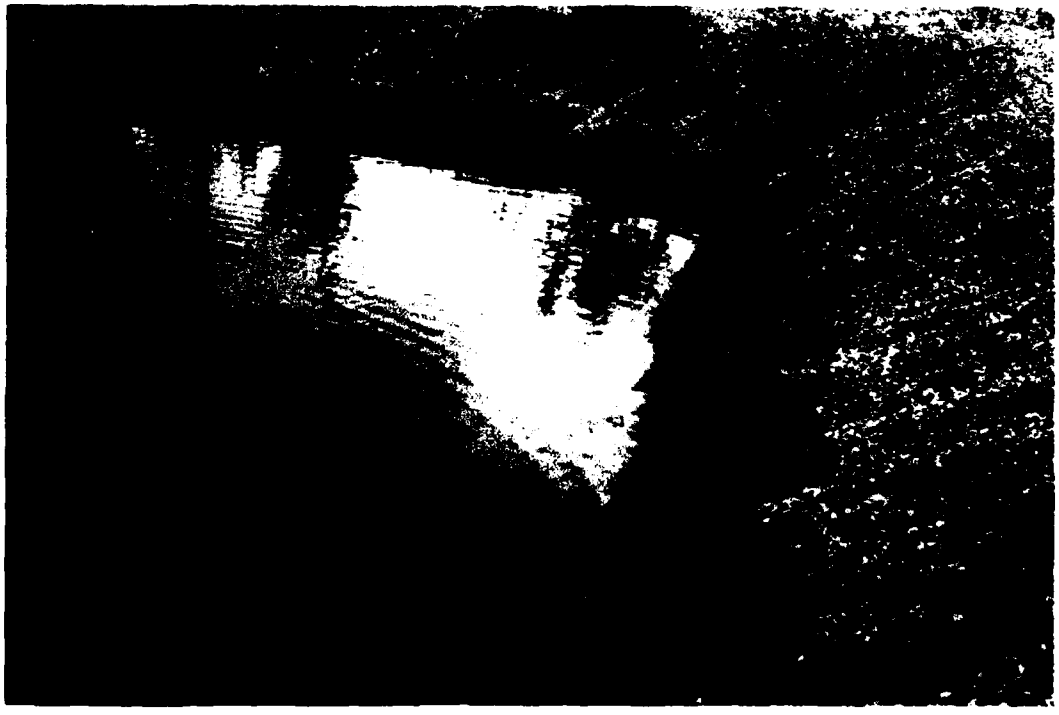

FIGURE J-2. Site No. 10—POL Lake. Photograph shows the bank of POL Lake where an oil sheen (floating hydrocarbons) was observed on the water surface.

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FIGURE J-3. Site No. 34—Sewage treatment plant sludge drying area. This site has been used for dewatering the digested sludge since 1973.

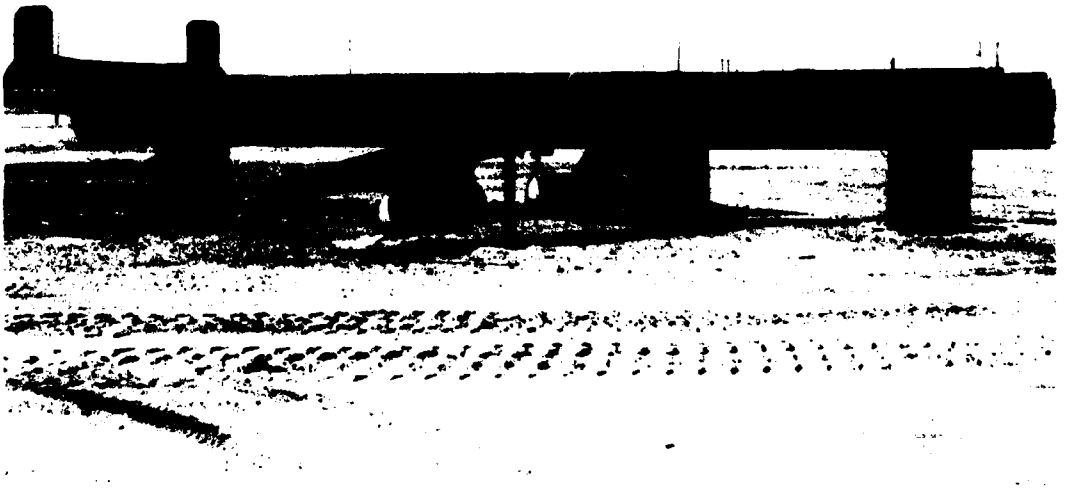
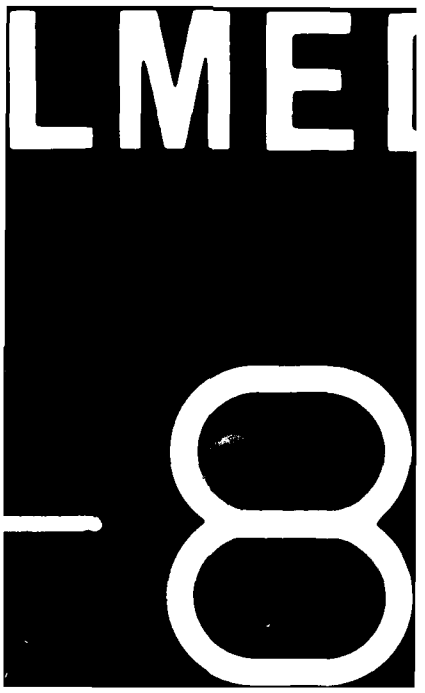


FIGURE J-4. Site No. 9—Current fire department training area. This site has been used for training exercises since 1976.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